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SADDLERY

SADDLERY

WITH NUMEROUS ENGRAVINGS AND DIAGRAMS

EDITED BY

PAUL N. HASLUCK

EDITOR OF "WORK" AND "BUILDING WORLD,"
AUTHOR OF "HANDYBOOKS FOR HANDYCRAFTS," ETC. ETC.

PHILADELPHIA

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PREFACE.

THIS Handbook contains, in form convenient for everyday use, a comprehensive digest of the knowledge of saddlery, scattered over more than twenty thousand columns of WORK—one of the weekly journals it is my fortune to edit—and supplies concise information on the details of the subjects of which it treats.

In preparing for publication in book form the mass of relevant matter contained in the volumes of WORK, much had to be arranged anew. However, it may be stated that a great part of the contents of this Handbook consists substantially of matter contributed by a working saddler.

Readers who may desire additional information respecting special details of the matters dealt with in this Handbook, or instructions on kindred subjects, should address a question to WORK, so that it may be answered in the columns of that journal.

P. N. HASLUCK.

La Belle Sauvage, London,
May, 1904.

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SADDLERY.

CHAPTER I.

GENTLEMAN'S RIDING SADDLE.

THIS handbook will treat on practical saddlery as more or less distinct from the making and repairing of harness, which is discussed in a companion volume on "Harness Making," where, however, will be found full descriptions of all tools, appliances, and materials necessary for the work. The elementary processes of cutting up hides, stitching, etc., are also explained in the volume on "Harness Making," and bits, spurs, stirrups, and furniture of all kinds fully described and illustrated. It is assumed here that the worker has a general acquaintance with the craft of the harness-maker.

In making a gentleman's riding saddle, the first article needed is a tree (Fig. 1), which can be bought with a round cantle (the back rising part) or with a square one rounded at the corners, and running in a straight line at the top.

The gullet or fore part of the tree is made in many styles; it may be straight or slanting backwards towards the seat, and it can be obtained full, half, or quarter cut. The tree may be measured along the centre, but the trade method is to measure it at the sides; the seat is measured across the widest part.

There are different styles of saddles both as regards work and material—namely, full shafts, covered all over with hogskin, with knee-pads or

flaps; all hogskin without knee-pads, a style which is called all over hogskin plain flaps; or full shafts, top and solid flaps—that is, the seat and skirts are hogskin, and the flap is of solid single-stamped leather, plain without knee-pads.

Another style is called shafts top demi-flap, the seat and skirts being covered with hogskin and a knee-pad with hogskin on a plain flap. Another variety is the half shafts with only solid skirts, the seat and flaps being covered with hogskin and having knee-pads on flaps. The commonest style, however, is a hogskin seat with solid leather skirts and flaps and without knee-pads on the flaps.

The saddle bars to which the stirrup leathers

Fig. 1.—Saddle Tree.

are fastened also vary in make and pattern; there is the ordinary spring bar and numerous patent bars, the attempt being to obtain a secure fastening for the strap and at the same time a loosening of it, in case of accident, to prevent the rider being dragged along by the foot.

The hanging or setting of the flaps is a mere matter of taste; sometimes the bottom slopes forward, and sometimes the flap is in a straight line with the front of the saddle (see Fig. 2).

To make a saddle, begin by preparing enough straining web to run along the centre twice its length and once over, with 4 in. hanging down below the tree just outside the saddle bars and towards the back. Having damped the web, nail each end firmly to a board—unless a web strainer

is used—and then push something underneath it to stretch it to the utmost.

After letting it dry, damp it once or twice according to the stretching necessary, but let it dry before being again damped. When stretched, cut it in two and nail two ends of it at the head of the tree in front, just outside the iron plate, one end slanting slightly to one side and the other to the opposite side.

Having pulled them together tight, nail them at the back of the tree low down below the cantle on the flat part. This slanting position throws

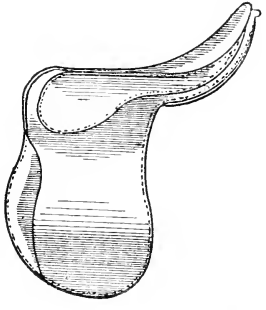

Fig. 2.—Gentleman's Riding Saddle.

them from 5 in. to 6 in. apart at the back as they are required; with headed saddle tacks nail them down closely, and tack the other piece of web across close to the saddle bar, bringing it a little under the point where the bar is riveted to the trees. Let 4 in. hang down on each side, and pull it very tightly over the web at the top, nailing it down with saddle tacks.

Next take another piece of web (any diaper web will do) and lay it close to the other web behind, then nail it down tightly; but it need not hang over. Run a stitch from one web to the

other, joining them across the top. A piece of strong linen, large enough to run from the web all round the seat behind, is stitched across to the web; nail it round the sides and back of the seat, covering the points of the web nailed behind.

Having pulled it tight, nail it in a position which gives the seat when stuffed a suitable rise towards the cantle, as this is the ground for the stuffing. Now stitch another piece of linen to the web in front to cover this part, and nail it firmly all round, and the seat will then be covered over without hollow but with a foundation for stuffing.

Take a piece of basil leather about 6 in. long or a little less, double it together along the centre, making it pointed at one end and rather full at the other. When stuffed it should be a little thicker than the middle finger at the full end, tapering away to a fine point at the other. Stitch the edges together from one side to the other, but not over, and leave a small opening at one end, through which the pad can then be stuffed smoothly and tightly with flock. The hole must now be closed and flattened slightly with the mallet. This raises each side of the seat near the root of the cantle, the thick end being close to the cantle and the fine end running forward. Put the pads in their places on each side, flush with the edge of the tree, and, after rounding them to follow the shape, nail them on the inside, putting a nail in the thick end to fasten it to the cantle at the bottom.

The seat must be covered all over with white serge; nail it over the edge of the cantle and over the gullet underneath in front, and underneath the sides as far as where the web hangs down by the bar. From this point towards the front, back-stitch it coarsely to just the shape of the skirt and seat; thus the seat is gradually narrowed

from the bottom to near the front part of the tree, but just in the front it widens slightly. The shape must be studied and the stitching done accordingly, of course through the foundation and cover at this part.

Now back-stitch the cover through the tree for exactly the length of the leather pads placed at the sides, in order to draw the cover in a little under the side of the pads and allow the seat and skirts at the joint of each to enter the hollow when the seat is adjusted.

Rub a patch, about 2½ in. by 1 in., in the centre of the cover with a lump of black wax, so that it will not unravel when a hole is cut there for stuffing. In the centre of this patch cut a slit 1¼ in. long, and, after passing a pound of white flock through the carding machine three or four times and clipping the wool, if long, with scissors, put it through the opening in small quantities. Use the seat iron for this work, moving the flock about to the sides to prevent lumps; continue stuffing until all is firm and level. Pass the left hand over the seat to ascertain that there is no unevenness, and level it with the seat awl held in the right hand; great care is needed to perform this operation properly. When the stuffing is finished a stitch must be run in the opening.

The seat, which should be cut from a piece of good hogskin large enough to cover the seat well and be nailed underneath, can now be adjusted. Damp and nail it on firmly, taking care that it is quite smooth in all parts; nail it underneath over the sides and at the back in such a manner that the nails can easily be pulled out with a claw, and that no mark will be left when the saddle is finished. Any mark would be visible and would stain the leather, thus completely spoiling the work. Pull it together behind the cantle so as to make all the small pleats form two large ones,

one on each side of the crupper staple; thus they can be cut and the edges stitched neatly together when dry.

After letting the seat dry, cut the skirts (Fig. 3) from a flat piece of brown skirt leather, and cover them with hogskin, which must be pasted over them before stitching and then allowed to dry; or paste a piece of serge on them, running to within $\frac{1}{4}$ in. from the edge all round, and, when dry, cover them with hogskin and stitch without pasting.

Before either covering or stitching, cut a piece of hogskin belly to run at a distance of 1 in. from the edge along the under part of the skirt to within 4 in. from the narrow point and $1\frac{1}{2}$ in. beyond in front, but low enough down to be nailed under the tree when the skirt is in place. Paste some linen on the flesh side of this for lining, and when it has dried put it in position on the skirt and cut holes through the skirt over the edge with a shoemaker's bent awl. The holes must not go through, but only be raised in the grain, which will be the under side when the skirt is finished.

Stitch on the hogskin cover, making fine stitches with yellow hemp, silk, or white linen thread, and beeswax near the edge. Run a row of stitches along the top $\frac{3}{4}$ in. from the edge from end to end, and then rub, polish, and finish well. When the piece to be nailed to the tree is dry, stitch it with fine cord beeswax thread through the holes previously made. Next prepare the flaps.

Knee-pads must be put in the front part of each flap along the side; then add the serge cover for stuffing, which must reach from the point of the skirt to the bottom, and be of the same shape as the flap on the outside and straight on the inside to within 3 in. of the top, and thence turned round to the front. Spot the serge in from underneath, marking the straight line with a rule

and creasing the outer line far enough inside to allow of stitching over again between it and the edge.

Slip two or three stitches just at the turning from the straight line at the top, bringing the thread over the serge so that there will be a hollow to stuff through before making another stitch. Then take the flap or shafteau block, and through the flap put a nail into the board in each end of the pad; stuff it full and evenly through the opening left for the purpose, moving the flock to its place with the seat awl. Give the pad a good shape, full in front and sloping towards the inside.

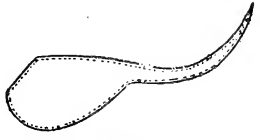

Fig. 3.—Saddle Skirt.

A small flat padding must also be placed on the opposite side of the flap at the top corner just below the swelling of the skirts from the narrow part over the flap. Spot a piece of serge slack there exactly the same shape as this corner of the skirt, and straight towards the bottom edge of the flap. A small opening like that in the knee-pad must be left for stuffing; fill it level. The flaps must be cut in pairs, and, like the skirts, should be made with the grain side underneath outside.

When the pads are on the flap, paste a piece of hogskin over them; then let them dry on the shafteau block to its shape. The hogskin must always be damped before the paste is applied, then pulled tightly over, and the nails must be placed so that their marks can be cut off. A band

of leather will also be needed along the straight side of the knee-pad to keep the hogskin close to the flap. Along the front run a smooth piece of string (nailing it at each end) to pull the hogskin into the hollow along the edge between the flap and the pad; let them thus dry. On removal from the block, cut the hogskin close to the edge of the flap and stitch the hogskin on firmly all round, and finish neatly, levelling the edges with sandpaper before polishing.

When the seat is dry the skirts must be stitched to it, the hogskin cover of the skirt being $\frac{1}{8}$ in. larger than the skirt along the top for stitching to the seat. Shave the edge of the hogskin to be stitched slightly, and, without removing the seat, place the skirt on the side of the saddle exactly in the position it should occupy when finished. It is better to arrange both skirts at the same time, employing tacks to keep them in place. Mark a line along the seat on the edge of the skirt, and also mark the various positions of the several parts of the skirt on the seat, so that if the former happens to stretch a little when being stitched, it can be pulled to place during work. Dots may be made with pen and ink in such a manner as not to be visible when the seat and skirt are stitched.

Before removing the seat from the tree, run a sharp knife along the mark from end to end of the skirt. Take enough dogskin welt to reach from end to end of the upper edge of the skirt and about 1 in. beyond; whip it to the edge of the skirt from end to end, employing single linen thread for the purpose, and making the stitches quite regular, so that when the seat is put in, the stitches can be run through the same holes. The welt must only just show when the leathers on either side are joined.

Having damped the edges a little, back-stitch

the seat to the skirt, using a pointed needle and thimble, and employing the holes by which the welt was whipped; take care that the marks on the seat and skirt are exactly opposite. The pieces used in nailing the skirt and seat to the tree must be separate by 4 in. from the narrow part, and when these parts are being stitched together along this distance a piece of the hogskin seat should be stitched on with the skirt and seat; bring it back from the point of the skirt to catch the stitches in such a manner that the point will run out between two leathers, the seat being on one side and this piece brought back on the other.

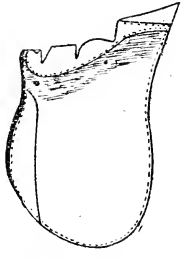

Fig. 4.—Saddle Flap.

Two pleats must be cut behind the cantle and stitched with a pointed needle from underneath, the stitches being run half through the leather on both sides so as not to be visible on the outside. The points of the tree projecting beyond the saddle bars must be covered with thin basil or hogskin; damp and paste it down from the front round the sides of the point to within 1 in. of the bottom and a little above the saddle bar.

Now adjust the seat and skirts, previously damping the seat all over; be careful that it does not get stained whilst damp by contact with iron. Nail the front over the gullet underneath the tree,

making the skirts perfectly level like the seat; nail it behind close by the edge of the iron plate under the tree, and slit it to go through the crupper staple. Small pincers may be employed to pull it.

The sides can now be fastened, a nail being driven alternately into each so that the seat will be quite square and straight. Cut a slit in the leather just nailed down, opposite the pieces of straining web left hanging, preserving the same width of leather as that of the web. Pull the leather tight with pincers and drive a row of nails through both into the tree. Trim off the surplus web and the waste round the seat close to the nails.

To adjust the flaps (Fig. 4), cut a nick upwards in front of each, a little wider than the point at this particular place, so as to run above it. The other portion passes under the tree behind the saddle bar, the next cut being above the hanging web. The end of this should be cut half-round, the farther portion being put round under the tree and nailed close to the skirt. Thus when the pad is fixed it will fit neatly to the corner of the skirt. Then run two or three stitches through the web piece and the piece above.

Now drive a tough silver nail through the top of the knee-pad at the point and clinch it underneath; drive another in the fore part of the other flap, and one behind on each side, just below the centre of the seat pad; drive the nail slanting through the tree and clinch it.

The next part needed is a gullet piece to run all round the front of the gullet and from the point of one flap to the point of the other. To make it, cut a piece of brown leather of the required length by 1 in. wide, and a piece of hogskin slightly wider. Stitch the hogskin on the other piece along the edge at the same distance from

the edges as the stitches on the flaps, and finish neatly. Then damp the hogskin and push in a piece of cord, pasting the hogskin down afterwards; put the cord close to the stitches from end to end and press the hogskin flat on the bottom leather inside the cord.

After punching a hole about $1\frac{1}{4}$ in. below where the seat and skirt join, slit the hole on the inner side and nail it down along the gullet underneath, sufficiently close to the tree for the cord to come tightly against the edge of the tree. Be careful that the slit is at equal distances from the centre on both sides; then raise the other parts below the slits on both sides above the tree to meet the ends of the flaps, making them meet the latter closely. Drive two or three nails into the flap, and make sure that the entire front of the piece runs in a level line with the edges on both sides of the flaps; then join the gullet piece and flap by a stitch below out of sight.

Another method of joining them is to stitch the gullet piece to the end of the flaps by means of a hogskin reaching beyond each end of the gullet piece; then stitch these together before adjusting the flaps.

Take two silver saddle staples and put one leg through the point of the flap and the other through the gullet piece and the tree; knock them down to their necks and clinch them below. When there is no metal name plate, cut a piece of hogskin oval, and, having thinned its edges, paste it close to the staple over the nails in the gullet piece and its joint with the flaps. The breast plate is fastened to these staples and in some cases to coat straps.

Having cut six stout girth straps 1 in. by 1 ft. 3 in., shave one end and slant the other into a fine point; then edge and rub them. Crease them double on the flesh side and turn up the end of

the web and leather hanging over the side until it is 3 in. long from the tree. Next stitch two straps on each side and nail the other straps, one on each side close to the first two; then make holes all along them. Then, in front of the skirt on each side at the point of the row of stitching, along the top, drive one tough nail and clinch it under the tree.

Two pear-shaped underskirts must next be cut and placed on each side under the straps; they should reach from the tree to a little more than halfway down the straps. Crease the underskirt with the hot creaser, and nail them under the tree, right under the girth straps. After cutting a piece of thin hogskin about $\frac{1}{4}$ in. wide, drive a nail in it close to the crupper loop and wrap it round the last from end to end; then fasten it on the other side with a nail. The flaps, close to their ends, are fastened to the tree by a leather chape put through and secured with fine tacks.

Some harness makers put silver dees under the saddle, nailing them with a chape just to show between the saddle tree and panel.

CHAPTER II.

PANEL FOR GENTLEMAN'S SADDLE.

THE saddle as made in the previous chapter is now complete with the exception of a panel (Fig. 5), and that is made as follows: Cut a good basil to the shape of the saddle underneath, and make it in two parts, joined along the middle. Drive a nail exactly in its centre at the front and back, and place the side of the saddle with the basil under it on the work bench in front. Now with the seat awl mark the basil all round the edges of the saddle, making it flush with the front and reaching at the back to the crupper loop, so as to cover the nails in the seat; it must also be flush with the side of the skirt as far as the flap; cut it to the same shape, but about 2½ in. shorter in the bottom only.

Cut a straight line from centre to centre at the front and back, and cut along the marks all round. About 2 in. from the centre, make a straight cut downwards for 1½ in. exactly, and from the end of this draw another straight line to the back, ending about 1 in. from the extreme point. Cut along that line and make one or two stitches at both ends to join the two sides of the panel. There will then be a hollow in the centre of the panel with each end attached.

Next line the panel along the top and front with basil or linen and allow it to dry, after which tack it on again, and see that it has not stretched in damping with the paste. If it has done so, mark the place, cut it off, and put a tack in the point, marking round the point for about 2 in. upwards

and around the bottom. Then cut two pieces of hogskin of the same shape as the point but slightly larger. Stitch them on where the points on the panel were marked, but sufficiently outside the mark to allow the points to enter easily, because they are pockets into which the points are placed when the panel is completed.

The hogskin facing can now be cut for the panel; it runs along the front on both sides and in the turning under the flaps, also round the back over the flap part of the panel on each side about 1 in. below the turning. Narrow it down gradually to nothing in the points at both front and back, and exactly opposite the gullet and opposite the crupper loop narrow it to about one-half its width. Back-stitch it to the panel with white linen thread and a pointed needle, taking care to make the facing ends level with each other at the points both at the back and front. Damp the edges and rub them down level with the rubber after they have been stitched.

Next lay the white serge for the lining flat on the bench, and place the panel on it with the wrong side out; then with a single thread of hemp coarsely tack the panel to the serge all round inside the facing.

Cut the lining about $2\frac{1}{2}$ in. larger than the back of the panel, and narrow it to about 1 in. at the extremity of the bottom. At the back also it must be cut about 2 in. larger, and gradually narrowed from the corners on each side of the flap to the same width as the other side at the bottom, namely, about 1 in. A little must be cut out of the front of the lining opposite the gullet, removing about half the width of what is over the back and likewise opposite the crupper loop.

After turning a little in all round the lining with a needle and thread, run a coarse tack in it close to the edge, and then whip it to the facing

and that part of the panel without a facing. Turn it inside out and make the lining equal on both sides; then put a little cord or a rounded piece of basil (damped and rounded) in the gullet just to meet the stuffing in both sides.

The panel being laid flat on the bench lengthwise, draw the lining smooth between the edges of the opening at the top and put a tack in the board at the back, with one on each side of the opening in front. Through the back and lining along the edge of the opening, from end to end on both sides, raise stitches about 1 in. apart at

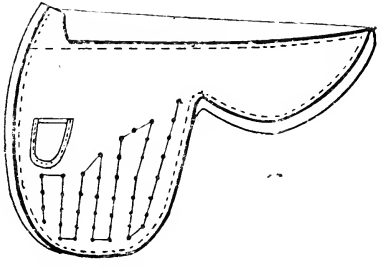

Fig. 5.—Saddle Panel.

the back, and a good 3 in. in front; the panel is now in two equal compartments with a hollow between them. Having cut a cross in the centre of its back near the lines, put one side of the panel on the bench, allowing the other to hang down by the side, after which, through the cross holes, each side should be stuffed pretty full with ready machined flock. Prepare the special quilting thread or a long three-cord beeswax thread to quilt the facing.

Holding the seat awl in the right hand, work down the flock to the facing, thus making a hard roll all round the panel to give it a permanent

form. With each stitch work the flock down, thus keeping it in its place with the thumb and forefingers of the left hand. Run the stitches from below close to the joining of the facing and back inside it in the panel; make very small stitches in the lining, and pull them very tight. The roll should be rather thick all round the back and along the front, but gradually smaller towards the front bottom. Turn the back upwards around the part under the flap where there is no facing, bringing the wool to the edge and tacking it there; but do not make the roll so hard as in the facing. Quilt along the gullet where the rounded basil was placed, and draw the facing firmly and smoothly over; begin and end at the back centre, meanwhile keeping the panel lining on the work bench in front.

The flock must be levelled by pushing it down to the facing with the seat awl, more being added to keep the panel full in all parts; be sure that the flaps are quite smooth and well filled towards the edges.

Five or six lines about 1½ in. apart should next be marked across the panel flaps, and two lines at the top back part of it half-way across; again mark them across with as many lines at equal distances from each other as will fill the space. Then quilt the flap, making a stitch at each joining of the lines, and on the two lines marked half across, having three stitches in one and two in the other at the back part of the panel. Add stuffing if necessary along the top of the back, but do not make it baggy.

The flock having been levelled with the seat awl, the work should be placed in position as follows:—After fixing in the pockets the points of the tree, pull the pockets until the points are right at the end; then tack the panel close to the gullet piece around the front and put two tacks

through the panel between the points of the crupper loop behind.

On each of six medium-sized nails place a tuft of flock close to the head, then put one on each side of the panel near the facing, at about 8 in. from the crupper loop, and another on each side in the middle of the panel nearer the front of the tree; finally, place one on each side in the front, about 2 in. from the top of the pockets, in the point outside the iron plate, and cut the flock close to the nail heads with a pair of scissors.

CHAPTER III.

LADIES' SIDE SADDLES.

CERTAIN important points must be attended to when ordering a tree for a side saddle. Such a tree is shown by Fig. 6. Sometimes this has a small off-head or point and sometimes a straight seat, or it may rise gradually towards the cantle, or, again, may have a long or short leaping head. Thus there is a great difference in the make of trees, and they are of plain hogskin, or with quilted, bolstered, or plain safe and skirts, or with doeskin in the seat or in the safe and heads. Others are quilted all over, seat, skirts, flaps, and safe.

The head or point is the part projecting on the side of the saddle in front, over which the rider's knee is placed; the other projection, head or horn, is now rarely of a size to which a name can be given.

The safe is the part in front which reaches beyond the saddle, covering the horse's shoulder to keep the rider's clothes from the horse; it either forms part of the flap or is joined to it straight down from the point.

To make a saddle with a small off-head and quilted or bolstered safe only, obtain a tree and strain the web thoroughly as for a gentleman's saddle. Adjust it in the same manner with the cross pieces and linen in a similar position to form a ground for the seat. Cover it also in a like fashion with white serge for stuffing, but make the sausage pad at the side where the rider sits twice as thick, or nearly so, as it is on the offside; if the seat runs down steep towards the riding

side there would be a danger of the rider falling from the saddle. Nevertheless, gradually increase the rounding, slanting it downwards as it approaches the front, for sharp corners here would hurt the rider.

The point must be prepared and stuffed as follows before the worker attempts to place the cover on the seat: Cut two pieces of stiff leather to the same shape as the head and to reach to the bottom on the inside, and of sufficient size outside the head all round to permit it to be stitched round outside the horn. Place one piece on each side and stitch each firmly to the horn; then put two

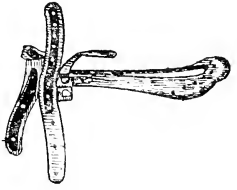

Fig. 6.—Tree for Side Saddle.

or three tacks in the outer one at the bottom, and thin the edges, giving them a good shape.

Shape a piece of white serge to the head, round at the top and about 2½ in. wider along the sides and as much longer at the top; then run a tack all round with white linen thread, turning in the edges slightly under the stitches and puckering round the top so that it will bulge when stuffed in the same way. Put the serge in the inside of the head and stitch it all round to the stitches in the two leathers on the outside, catching the edge of the serge and then running the needle through the stitch in the leather so that the serge will cover the edge of the horn. Be sure that it bulges equally in every part at the top and sides.

Cut some clean carded flock small enough, and with it stuff from the bottom, pushing it to the top with the seat awl until the stuffing is firm and plump everywhere and smooth round the edges and top. Then from the back make a few stitches along the sides, backwards and forwards, to keep the flock in its place; do not pull the stitches very tight, for this would cause unevenness of surface. If the centre does not seem quite full enough when the edges are quilted, a little more flock may be put in place, and the surface afterwards made perfectly level all over with the seat awl.

The point being covered and stuffed, place a piece of serge on the outer side of the small head and nail it in the bottom and turn it in along the edge of the head; then fasten it down level. It need not be placed nearer the back of the saddle than where the seat cover is to be nailed. Adjust the serge, nailing it at the front, sides, and back, as for a gentleman's saddle; but cut it round the stuffed horn and turn the edges down underneath, nailing the ends in the front. Also, along the edge of the little horn, turn in the edges of the seat cover and whip this to the turned-in edge of the piece pasted underneath, along the extreme edge of the point. Cut the hole or slit in the centre of the seat and stuff in the same style as a gentleman's saddle, levelling down to all parts round the sides and round the top of the cantle.

To keep the flock in its place, quilt along the ridge to the root of the cantle from the point or horn on the near side, giving the seat the aspect of a flat, full square edge from the root of the cantle to the point; the other side is worked in a similar way.

In pushing the flock with the awl under the quilting, too much may have been pulled from the centre of the seat; if so, fill and level it again

with the seat awl, taking care that the front point, and up to the tip of the small point on the opposite side, are well filled and smooth.

Now take a piece of hogskin large enough to cover the long point and nail it at the back, pulling it tight and tacking it close all round the top so as to obliterate every pleat; leave it on the point to dry. The hogskin seat having been damped, put it on the saddle and place a small piece of hogskin outside the small point to cover the serge put there for stitching the serge seat cover; both the hogskin and serge must run along the edge of the small horn.

The hogskin seat must be cut all round the long point, a hole being made of a size to suit the space required by the root of the points; draw the ends of the leather across each other in front at the outside, and tack them low down. When the seat and point cover have dried thus, cut a piece of firm leather to the same shape as the hollow at the back of the long point facing the operator, fitting it tightly between the stuffing at the top and along the sides. Then cut a piece of hogskin to cover this piece, and shave the edges of both; the hogskin should be about $\frac{1}{8}$ in. larger than the stiff piece all round.

After pasting the leathers together and allowing them to dry, adjust the skirts in the same way as with the gentleman's saddle, and cut along the line of mark likewise; then dot the position of various parts of the skirts and seat. Place the thin hogskin welt along the upper edge of the seat and stitch the skirt and welt together, but no farther than the root of the big point; run on the other side opposite under the short point.

From the point to which the seat is stitched, a wider welt doubled like the narrow one must be stitched to the skirt, running from this part to the end; a narrow welt must also be made

around the seat at the edge of the hole cut for the point, and a broad welt stitched to that as in the skirt. Likewise, at the other side, under the short point, make a narrow welt and a broad one as in the end of the skirt, and again make a narrow welt along the edge of the hogskin piece placed under the short point, and stitch the seat on it from the place where the seat and skirt of the saddle part.

The piece of hogskin, when put in place, will go under the edge of the skirt to be nailed underneath. Be careful that the ends of the leather which come round the long point meet and are tacked neatly under the skirt on the near side below the big point. Now remove the cover round the long point and make a small welt around the small back piece and cover it with hogskin. Stitch the cover to it all round and take care that it does not stretch or pleat round the top.

Having turned the cover inside out, damp it and then slip it down over the point, cutting a few nicks in the bottom so that it may go low down with the bottom flat on the seat. As there is a hollow between the two sides where the side padding bulges out at the back of the point, and as the back piece does not run so close to the back point as is required, put some paste between the back piece and the point and press the former hard down into the hollow, as though pasting it to the point, until the sides stand out prominently all round.

To keep it thus and make it stick to the point by the paste, put over it two or three thicknesses of soft leather, brown in colour, of the same shape and size as the piece; then roll a soft rag round the point and the leather so that it will press the back piece close to the point; thus the paste, when dry, will keep it in place. Nail the back piece to the tree at the bottom with two or three

cut tacks out of sight, and cut the pleats in the seat behind the cantle and stitch them.

The points running to the pockets on the panel must be covered in the same way as those of the gentleman's saddle with thin hogskin or basil. After damping the seat, put it in place, nailing it in front and then at the back, and tightening it down well around the sides. Nail the piece of hogskin behind the short point, and pull the seam with the welt exactly along the edge in all parts. The points of the skirt must be drawn tightly towards the front and a tack put in the end, plac-

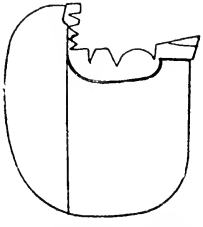

Fig. 7.—Lady's Near-side Flap and Safe.

ing the edge of the skirts at both sides under the points; cover the nails and ends of leathers fastened there, and cut the waste all round the back and sides close to the nails.

Some makers put a pocket on the centre of the off skirt to carry the rider's gloves or handkerchief; this pocket must be made before the under pieces are adjusted and before placing the skirt on the seat. The shape may be square, about $4\frac{1}{2}$ in. long and $3\frac{1}{2}$ in. deep. Stitch the leather along the bottom on the flesh side so that when the material is turned upwards the stitches will be hidden, and make a small gusset on each side, 1 in. wide at the top and tapering down to nothing at the bottom. Turn in the gusset at the centre,

and stitch one side of it to the pocket and the other to the skirt. Cut a loop, and put both ends of it in the front, cutting holes for them; then stitch them across.

An overlap, of the same length as the pocket and like a pocket-book overlap, must be cut and stitched to the pocket in the same manner as the bottom on the flesh side, and turned down towards the front to cover the stitches. Hogskin is the material employed, and the overlap may be lined and stitched all round or neatly creased with a hot iron.

The near-side flap (Fig. 7) and safe are generally in two pieces, joined in the centre in a straight line with the point side in front. The back part is like a saddle flap, but is a little fuller in the round at the bottom; the back part reaches no farther than level with the end of the saddle-bar front side, but the fore part or safe in front runs a little beyond the centre at the top. The safe part and back part or flap are cut singly, and then joined together at the straight line by a closing stitch with strong black wax thread, crossing this from side to side every six or seven stitches.

For a bolstered safe, cut a piece of hogskin the same size as the safe part, allowing 1 in. all round for the bolstering, and covering in the centre the joint of the safe and flap part. Next quilt the hogskin and mark it all over with a regular pattern by a small single crease; press it hard with a pattern of flowers, leaves, or any other fancy design. A piece of calico large enough to line it should now be cut and stitched along all the marks with white or yellow silk or linen thread, either single or double. The outer lines must be stitched first and puckers avoided, leather and calico being perfectly flat; and a hole should be pricked every space in the pattern.

Now stuff all the spaces with very fine flock

cut small with scissors. A small edge tool can be employed for stuffing, the seat awl distributing the flock over the spaces; stuff just sufficient to show the pattern well on the outside and to give a pleasant feeling of softness to the touch. Then place the cover on the safe part, edge to edge, and cut it level with the safe, crease round the edge of the cover, and prick it very fine.

The underneath of the opposite straight edge must also be pricked, but not the top as for the outer side; the pricking must be much coarser than the top side. Stitch it, wrong side out, outside the joint of the flaps and safe; then turn it over towards the front to cover the stitches and bring the cover edge to edge with the safe. Next stitch it round the edge, double-handed, and finish neatly.

When the flap and safe are covered with hogskin and the safe is treated as described, the hogskin has only to be pasted on the flap part and stitched round. If, however, a covered safe is made without bolstering, paste a piece of serge over the safe; then place the hogskin as above described without pasting. In some cases the safe is not covered at all, the flap and safe being made in one piece and stamped, with the edges rounded and polished only; there is then no creasing on the saddle. Whenever flaps or skirts are lined with serge, do not let the serge come up to the edge or under the stitches; it should come only just to them.

The flap on the off side is, of course, a small one, exactly as for a gentleman's saddle, but fuller in the rounds below. If covered, make it like the other flaps, with or without serge. When putting the off-side flap in place, make a gullet piece from the end of the front of the flap running to a little over the centre in the top, so as to be covered by the point of the safe. Put the off-side flap in its

place, nailing it underneath from the point backwards and above the point in front.

When placing the safe and flap on the near side, nail them likewise underneath; then on this and on the off side, where the web hangs down for the straps, cut a punch hole in the front of the safe close by the tree and near the end of the flap, and turn that part of the flap to the point underneath the tree, nailing it along the gullet.

When a leaping head is employed, a hole must be cut through the safe to screw the head in place.

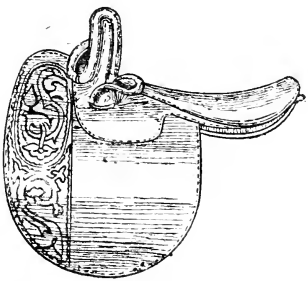

Fig. 8.—Lady's Saddle with Quilted Skirt and Leaping Head.

Cover and stuff it exactly like the other long point, but use a piece of leather for the bottom. A hole must be made in it through which the screw peg passes, and it must be cut to the same size and shape as the point at the bottom. Finally stitch the point cover and this leather together all round. The straps for the girths are adjusted on the web.

The thin brown leather girth, a part which does not belong to a gentleman's saddle, can now be put on, its length being $3\frac{1}{2}$ ft. and width 2 in. An inch buckle with a roller is needed at one end, and the chape should be cut slanting from both sides to its width. Make a loop for it, and another

about 6 in. lower on the girth for the overlap of the strap, if there is any.

Cut another piece 1 ft. long and 2 in. wide, and a strap 1 ft. 6 in. by 1 in. stitched to one end. Having stitched them neatly, edge and rub the borders and make a narrow hot crease very near the edge; the stitching may be made inside. On the girth have two rows of cross-stitching on the near side, and two rows on the off side; the girth will buckle the reverse to the usual way, and can be adjusted whilst the rider is in the saddle.

Two cross straps for fastening the girth strap are employed by some makers, one being fastened through a hole in the flap at the top of the panel point, and the other under the panel behind, outside the flap; these straps meet and are stitched to a ring on the centre of the flap, the strap being again fastened to the ring and hanging down. The tough nails are placed similarly to those in a gentleman's saddle, namely, one at each point of the skirts in front, one through the flaps on each side at the point, and one on each side at the narrow end of the skirts behind.

The panel is made as described in Chapter II., but slightly wider, to go under the safe in front, and the near side is filled rather more. Fig. 8 shows the finished lady's saddle with leaping head and quilted skirt.

CHAPTER IV.

CHILDREN'S SADDLES OR PILCHES.

A PILCH is the form of saddle used by a boy or girl, and is made as described in this chapter.

First the top is cut somewhat like a saddle panel, but smaller, and in a straight line along the back. At the joint a welt is placed, and stitched double-handed on the under side. This top can be made of plain, stiff single leather, or covered plain with basil or hogskin, or covered and quilted like a lady's saddle safe.

If it is covered, the cover must be tacked coarsely along the edge, and then bound with leather. A roll, if placed behind, should reach round the back and come to a fine point at each end. Cut some linen to the required shape and size, and double and stitch the edges together; then, after stuffing the roll hard with flock, quilt it firmly, and put a stitch here and there along the bottom through the linen and the saddle top.

Having drawn it tight all round the back of the seat, bringing the points down level to each other at each corner of the flap part of the top, cut a piece of hogskin or basil large enough to cover the roll. Raise a stitch along the bottom on both sides of the roll in the cover, and run the stitches up and down through the saddle top or cover, thus drawing the latter down tightly over the roll.

Next quilt the roll, making stitches from side to side, placing a little tuft of flock under each stitch, and drawing them tight; finally fasten the thread securely in the end.

If the saddle is a reversible one (for boy or girl), it must have heads, to be put on or taken off as required. Sometimes the heads are joined together at the top, with two long points running down, one on each side, at the shoulder. If such a head is employed, two long loops must be put on the side of the saddle for the points to enter and to keep the head in place; make a hole at each end of the points, and rivet a strap at the near side and a girth on the other side to go under the belly and fasten the head when in use.

Another method is to have the heads loose and separate, in which case a piece of iron of suitable shape, with two tapped holes in it, is needed; it must be in a proper position for screwing in the heads and there must be a screw on each head to enter the holes from above. The iron must be fixed on the panel by a piece of leather placed over it on the panel, and then stitched all round. Cut a hole in the leather of the saddle top for screwing in the points.

For stuffing the heads, cover with leather as in a lady's saddle; two or three thicknesses of felt, however, can be employed instead of stuffing. With a common pilch it is not necessary to go to so much trouble; a herring-bone stitch will do to join the cover together. When the heads are screwed in, cover their bottom with leather, stitching it to the cover all round. When the heads go to the loops at the side, cover the points going down to the loop with thin leather, and herring-bone stitch it underneath.

To fasten the straps for the girths a piece of webbing will be needed about 1 ft. 3 in. long; to its ends 2-in. straps, 10 in. long, must be stitched, the end of the web being turned in under the stitch. Then take a piece of web about 1 ft. long, and whip it to the edge of the other piece at equal distances from both ends, and adjust two

chapes and a 1-in. buckle with the tongue taken off for fastening the stirrup straps. Stitch this to the lower part of the top cover right in the centre, and before fixing the basil or hogskin cover bring the buckles for the stirrup straps forward, and cut a hole for them to come through on the outside without making the web visible.

When the top cover is in position, stitch round the hole, which should be close to the loops, where the points holding the head run down in front, or where they would be with loose heads; see that the holes are at the same distance on each side from the centre. Stitch the web firmly through the top from end to end; add the cover and bind it, and then put on the roll behind. If considered necessary, a piece of web may be added at the middle, and joined to the other web, together with a chape and a 1-in. tongueless buckle, to come out behind at the centre for fastening the crupper.

A safe will be needed when the pilch is for a girl. Cut it to fit the front of the saddle neatly, and cover or bolster it, or leave it plain. With loose horns it can be shaped in cutting so that it will fasten under the point, the screw of the head being put through a hole in it to the iron below, and fastened at the bottom with a buckle and strap.

If the head is removable with points, it must be fastened with straps and buckles at both ends, and, if necessary, a strap placed in the middle.

The panel is made exactly like a saddle panel, but is fastened by putting stitches through the top here and there along the front and round the back near the edge. A small tuft of flock should be placed under the stitch on the panel, and every stitch should be knotted over the flock as the work proceeds. Cut the thread, and do not fasten the panel quite at the bottom of the flaps, but about 5 in. from it.

Make a pair of 1-in. stirrup straps, 1 ft. 8 in. long, and obtain a pair of boy's irons, which can be bought tinned for sixpence a pair; then a ready-made slipper for a girl, with a strap for it of the same length as the others, and a pair of girths, 1 ft. 6 in. and 1 ft. 8 in. long, will complete the pilch.

It has been shown that pilches are boys' and girls' saddles made without trees, but, according to some authorities, they do not properly come under the denomination of saddles. They are, at all events, an improvement on the old horse cover which in the beginning did duty for the saddle. Pilches are, or were, used also by rough riders and circus riders, probably because of the fact that pilches accommodate themselves to almost any horse, though they lose their shape under a heavy weight.

CHAPTER V.

SADDLE CRUPPERS, BREASTPLATES, AND OTHER ACCESSORIES.

THIS chapter will describe the making of saddle cruppers, breastplates, martingales, saddle girths, stirrup leathers, and saddle cloths.

Full-sized saddle cruppers (Fig. 9), which are used to prevent the saddle from advancing too much, are made about 1 in. wide, and sometimes a little more, the body being about 1 ft. 6 in. long, with a slit of about 5 in. in one end, the other being turned in for a $\frac{7}{8}$-in. buckle; shave the points of the slits and the end of the chape.

Having cut a billet of the same width as the buckle, and 2 ft. 4 in. long, trim one end for the buckle and shave the other. Edge them and polish the edges, creasing them with a hot checker. Adjust the buckle and stitch the billet, making the first stitch by the buckle over the edge and the chape and billet together, and the next stitch through the loop. Now run four or five stitches towards the point on each side, and return to the buckle on the other side, making the last stitch over the side the same as the opposite side.

Put a loop on the flat lower down the body of the crupper, say about 6 in. from the buckle, stitching it across in each end, and then make a dock much smaller in circumference than the gig crupper dock, the leather being cut about 1 ft. 1 in. long.

Take a piece of string about 1 ft. long, and roll wet brown paper round it until it is of the required thickness in the middle; thin the ends

by cutting the paper before damping it. Stitch the leather over it as it is, without cutting a groove, drawing it very tightly over the paper. See that the leather is soft and pliable, and damp it before stitching. Having dried the dock, finish it in shape, and then stitch the dock to the slits, giving it about a $1\frac{1}{4}$-in. splice. Put about a dozen holes in the billets, and vary their lengths according to the size of horse for which they are intended.

Breastplates (Fig. 10) are made for hunting

Fig. 9.—Saddle Crupper.

saddles to prevent them falling backwards, just as the crupper keeps them from advancing too far. To make them, the following parts are needed:—One $1\frac{1}{2}$-in. covered ring, two 1-in. covered rings, two $\frac{5}{8}$-in. covered buckles, and one 1-in. covered buckle.

Cut two side straps $\frac{7}{8}$ in. wide, and 2 ft. in length when turned over the rings in each end; round the top, place on the groove board, and stuff with strands of soft cord. Stitch them along both

sides, very finely, with silk cotton or linen thread, placing a 1-in. ring at one end of each, and the two ends in a $1\frac{1}{2}$-in. ring; polish the edges well after stitching. Then cut a $1\frac{3}{8}$-in. strap to be 10 in. long when bent over the rings at each end; shave the ends and prick the sides finely like the shoulder piece.

Another piece must now be cut $9\frac{1}{4}$ in. long when bent for the rings, $\frac{7}{8}$ in. wide at both ends,

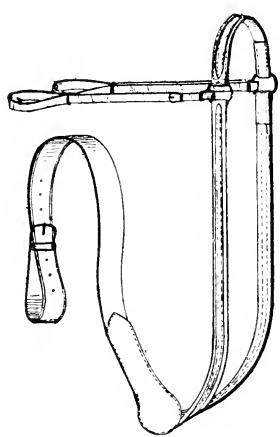

Fig. 10.—Saddle Breastplate.

but running gradually to a central width of $1\frac{3}{4}$ in. Put the chapes in the 1-in. rings, and stitch both pieces together. Two $\frac{5}{8}$-in. straps, 2 ft. long, must be made, one end being prepared for the buckle, the other narrowed; then edge, rub, and crease them with a hot checker. Place one in each of the 1-in. rings to within 3 in. of the buckle. Double the 3-in. length with the buckle on the top, and make two loops between the two leathers. Stitch from the ring along both sides to the buckle,

the loops, of course, being fastened at the same time, and, having finished the edges of the stitched part, make seven or eight holes in the points of the strap.

The long side straps must run down from the shoulder to the chest, and the short cross strap should pass over the neck at the top. The two small straps have buckles to fasten to the staples that are placed in front of the saddle. A strap is needed to go from the big ring to the girth

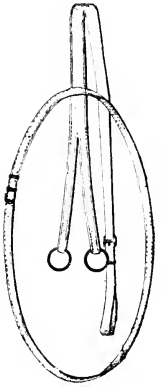

Fig. 11.—Martingale.

under the belly between the forelegs; cut it $1\frac{1}{4}$ in. wide and 3 ft. long. Narrow it down to 1 in. at 1 ft. from the bend at the ring, and turn it down for the buckle at the 1-in. end; edge, rub, and crease it, then put the buckle in the reverse way.

Now cut eight or nine punch holes, beginning about 8 in. from the buckle, and buckle the strap backwards, making a loop for the bellyband to go through. Place the other end in the ring, and cut a safe to go under it and run above under the

ring round the top part, then passing down for about $3\frac{1}{2}$ in. below the bend, and gradually growing narrower towards the end almost to the width of the strap.

Crease the safe, and place it in position under the chape and ring; then, having stitched it down

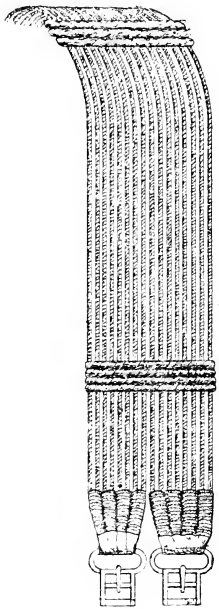

Fig. 12.—Saddle Girth.

neatly on both sides with a fancy stitch in the centre, line the safe with a piece of chamois or very thin buff, stitching it in all round the safe. Stuff a little flock through the opening in the bottom, and then close the opening with fancy stitching, such as an arrow point. It can be made of

single leather without any lining, the bends only being stitched.

A combined martingale and breastplate can be made by cutting a strap $1\frac{1}{2}$ in. wide and 15 in. long; the strap must then be slit for about 11 in.; the points of the slits are bent for a chape to suit a $1\frac{1}{4}$-in. brass, ivory, or leather-covered ring. A buckle and billet are put in the other end for

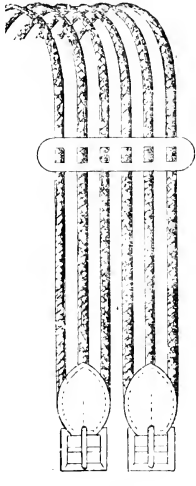

Fig. 13.—Saddle Girth.

fastening to the $1\frac{1}{2}$-in. ring on the breastplate. The slits may be made round or flat, and the chapes must be narrowed a little at the rings and to $\frac{3}{4}$ in. at the buckle end, a billet made of this width.

Martingales (Fig. 11) are made with straps round the neck, either flat or round, and with or without a buckle; the total length is about 4 ft. 6 in., and the flat strap is $\frac{3}{4}$ in. wide.

When a buckle is used, a piece of leather is placed about 1 ft. 3 in. from the buckle for the breast strap, and is stitched at both ends. A piece is put in to make an opening, the rest of the neck strap being rounded, with about 1 ft. left flat for a $\frac{3}{4}$-in. buckle. If no buckle is employed, an opening can be made by simply over-

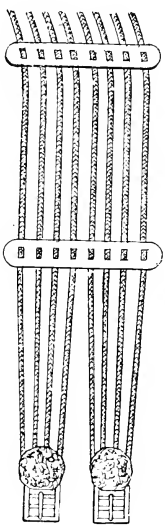

Fig. 14.—Saddle Girth.

lapping the ends and leaving space enough between the two splices for the breast strap.

The breast strap is cut $1\frac{1}{4}$ in. wide and 4 ft. long, is slit for 1 ft. 1 in., and may be flat or round; in the latter case, it must be wider to begin with, say $1\frac{5}{8}$ in., and then slit in half. When flat, narrow it at the unslit end to 1 ft. 6 in. from the end, and, having fixed a 1-in. buckle there in

the reverse way, buckle it to form a loop; this buckle must be adjusted before the rings. Then run the buckle end through the opening in the neck strap, and the martingale is complete.

Saddle girths (Figs. 12, 13, and 14) are made of linen, worsted, or union (that is part linen and

Fig. 15.—Stirrup Leather.

part wool); they are also made of raw hide, whip-cord, and plaited brown leather. It is, however, more common to employ the first-named material.

Girth buckles must be obtained with safety bars across them, and the chapes should be cut pointed at the ends, swelling out at the sides to grow narrow to the width of the buckle at the

top, where they bend. Always stitch them round, and put a straight line in the centre to keep down the point of the turn-down; only about twelve or fifteen stitches are put in the centre.

When this has been cut and prepared for the buckle, stain the edges and turn in both corners of the web to meet in the centre; then run a stitch through them to keep them down, and cut a little off the extreme point and tack the chapes and buckles before stitching. The length varies from 3 ft. to 3 ft. 6 in.

A Fitzwilliam girth is made of web 5 in. wide, the ends being bound with leather and a chape

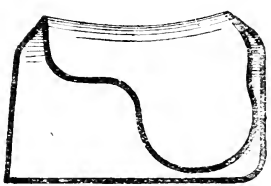

Fig. 16.—Saddle. Cloth.

and buckle placed on each side—that is, in each corner, two at each end of the girth. A 1-in. loop is then put across the girth, 5 in. from the end, on each side, and the loops are stitched across twice at each end, an opening being left in the middle for an ordinary girth to pass.

A single ordinary girth must then be made, one end placed through each of the loops, and the Fitzwilliam girth is complete. It is a very safe girth, and keeps the saddle steady in place. If so desired, chape punches can be obtained which cut out the chapes at one stroke, or for cutting partly round or cornered patterns the head knife may be used.

Stirrup leathers may now be described. It may

be said that their purpose is to connect the stirrup irons to gentlemen's saddles, and hold the irons in place. For ladies' use, only one stirrup leather is customary, and sometimes this is made in the same style as a gentleman's; more often, however, a single strap is employed to connect the stirrup, this strap passing through a hole in the saddle and joining the balance girth underneath the flap.

Stirrup leathers (Fig. 15) must be made from stirrup middlings, and with stirrup leather buckles; the width may be $1\frac{1}{8}$ in. to $1\frac{1}{2}$ in., but $1\frac{1}{4}$ in. is most common, whilst the length varies from 4 ft. to 4 ft. 6 in. There is no need to cut holes

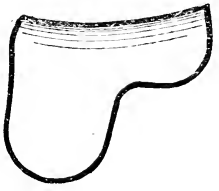

Fig. 17.—Saddle Cloth.

for the buckle tongues, as these do not go through the leather.

Having bent the strong end for about 2 in., stitch it firmly to the bottom of the buckle, narrow a little on the buckling end, and nip a little from each corner. Stain the edges, and polish them well, and crease double and heavily with a hot screw crease on the flesh side, instead of the grain side as with other straps; finally turn the chape at the buckle the reverse way, and make about eight holes in them.

As a rule, saddle-cloths (Figs. 16 and 17) are made of felt in the same shape as the saddle, but a little larger. Each is cut in two pieces, with a small curve at the back, rising a little at each

end, and stitched together with a whip stitch. A piece of binding is stitched along the joint, and the edges are then bound with red, yellow, or blue cloth. The felt can also be obtained in various colours—blue, brown, fawn, etc.

With regard to the use of the saddle cloth, it is shaped so as to go easily under the saddle, where it protects the horse's back and the panel of the saddle by absorbing the perspiration; the effect of the continued perspiration on the leather of the saddle panel is to render it hard.

The saddle cloth can be used also when the stuffing of the saddle is unequal; this is a good remedy, and one that has been used almost universally in the cavalry. In the army, saddle cloths known as numnahs, and are made of felt. This is certainly the best material to use for the purpose, but kersey, cloth, and holland have been commonly employed.

Kersey, it may be said, is a kind of coarse woollen cloth and usually is ribbed. Devon kerseys were famous as far back as the fourteenth century.

CHAPTER VI.

RIDING BRIDLES.

A SNAFFLE bridle is a single head and rein bridle, the cheeks being about $\frac{7}{8}$ in. wide and 9 in. long. The cheeks must have a buckle at each end, one with a chape turned down, and the other on the flat end of the strap, without turning, and with the billet underneath. For riding bridles (Fig. 18) the buckles are made square, round, or fancy shape, and are of brass, tinned or plated. Leave space for a loop before the buckle and the point of the cheek, the billet being placed far enough behind the buckle for two loops; a runner loop is needed on the cheek, and another stitched with the chape at the buckle, the billet being cut 9 in. long. They should be stitched-in single-handed, and back-stitched with linen thread or silk, according to the style of article to be made.

All the stitching must be done from behind, so that the best face of the stitches will be next the horse when the bridle is on. Make one hole in each billet, leaving enough material to pass through the two loops and cover the stitches.

The cheeks being finished, cut the head strap $1\frac{1}{8}$ in. by 1 ft. 10 in., and slit it for 5 in. on each side. The width of this strap varies with that of the cheeks and throat lash. A $\frac{3}{4}$-in. cheek should be slit $\frac{3}{4}$ in. on one side and $\frac{3}{8}$ in. for a $\frac{3}{8}$-in. throat lash, taking care that the wide slits are both on the same side in each end. After punching four holes in the wide slit, and six closer together in the narrow ones, make the front $\frac{3}{4}$ in. by 1 ft. $2\frac{1}{4}$ in. from the end of one bend to the other, after

bending. Turn it over the head strap, and mark a line across close to the head strap, thus having 1 ft. 1 in. between the cross lines. Stitch the ends down, with a row along each side, and make the throat lash $\frac{3}{8}$ in. by 1 ft. 7 in., after turning down for the buckles. Put two runner loops on the throat lash in addition to the loops at the buckles of each end.

Now cut the reins, which measure 1 in. or $\frac{7}{8}$ in. by 4 ft. Prepare them for the buckles like the bottom of the cheeks in the flat, place a $\frac{3}{4}$-in. covered buckle at the other end, narrowing the

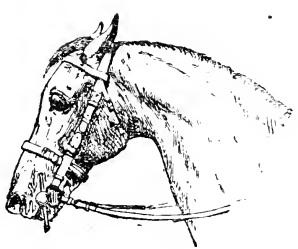

Fig. 18.—Riding Bridle.

chape down to the width of the buckle and the end of the other rein also for buckling. Put in the billets, with one loop before the buckle and two behind, and always put the strong end of the rein in the billet end; the length of the billets is 10 in.

Sometimes the bridle is made without any billets, the cheeks and the reins being stitched fast to the bit; but the advantage of the other method in making it possible to remove the bit is evident.

The Pelham bridle (Fig. 19) is made like the above as regards the head, but with a noseband,

which is made singly or lined along the front part and stuffed; it is cut either straight or swelled in the front, the length being 2 ft. 4 in. after adjusting the buckle. Any ornamental pattern in the stitching on the centre must be put through single leather, then lined, and the outer lines stitched.

With a noseband the billets must be made a little longer, so that a space can be left between the two loops above the buckle unstitched for the noseband to run through both cheeks.

The Pelham bridle also has two reins, one about

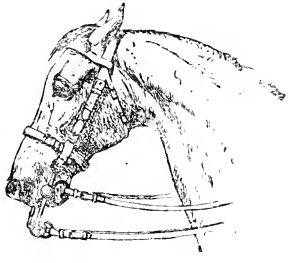

Fig. 19.—Pelham Bridle.

1 in. wide, and the other $\frac{3}{4}$ in., the length being the same as that of the snaffle reins. They have billets at the ends, and the wide rein has a buckle at the top also, but the narrow rein is spliced together in the centre without a buckle. The bit has a curb and long cheek, with two rings for buckling the reins, the narrow rein being at the bottom ring and the wide one in the ring by the mouth.

The Weymouth bridle (Fig. 20) has two heads and two bits, a hackney and a bradoon. The head fastening to the hackney bit is made as for the Pelham bridle, with a noseband, but the head

fastened to the bradoon is made with one cheek only, about $1\frac{1}{2}$ in. longer than the cheek of the other head, and from the other side is one strap with a billet and buckle at the bit; it passes over the head, under the other headpiece, and underneath through the forehead band loop below the other headpiece, and buckles in the cheek on the off side. This second head is $\frac{3}{4}$ in. wide, and the long side is about 2 ft. 9 in. long. The two reins must be exactly like the Pelham reins.

Bridles are made in different styles, and with fancy patterns; for example, rounded cheeks and part length rounded reins, leather rosettes, plaited throat lash with tassels, plaited fringe on noseband, etc.

Ladies' bridles are made like gentlemen's, but lighter and more ornamental. Sometimes they have plaited cheeks, hand parts for reins, rounded, plaited, or fancy covered fronts, and fancy leather rosettes, whilst tassels may hang from the throat lash.

Various styles of bits are specially made for a strong-headed or runaway horse; one style of gag bit is something like a snaffle, but has two holes in the ring opposite each other. The rein runs through these holes, being rounded for about 12 in. at this part, and a buckle and loop are put on the end of the rounded part after it is through the holes in the ring, whilst the buckles from the bit act instead of a cheek when the head strap is buckled, so as to form both rein and cheek. The total length is about 10 ft. Thus, the more the rider pulls the rein, the tighter the bit rises in the mouth, the pressure bringing the bit and headpiece together. To obviate the necessity of always keeping this tight, to hold the bit in the mouth, another rein is made as usual, and fastened to the bit, so that when quiet the horse can be driven with this rein.

A material that looks well in bridles is plaited cord, with billets and buckles like leather bridles.

Exercising bridles are made like snaffles, but, of course, with stronger leather and a slight difference in the bit, to which the rein is fastened at one end by a small bar of the same material as the bit, and at the other by being stitched to the bit ring. As the bar is too long to pass through the bit ring, pulling the rein at the centre during riding will not bring it through the ring; but when the rider wishes to lead the horse, he takes the bar in his hand, and pulls the rein through

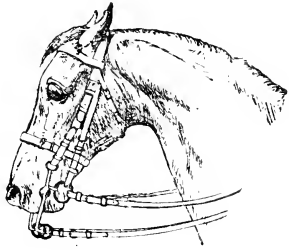

Fig. 20.—Weymouth Bridle.

the ring. Thus it will answer the purpose of a leading rein and a curb, giving greater power over a vicious horse. Exercising bridles are also made with winkers of light brown leather, blocked and stitched to the cheek quite close to the buckle, everything else being the same as for the snaffle bridle.

Stallion bridles are made on the same principle, but are much heavier and more ornamental. The cheek is of a wavy, swelled pattern, 9 in. long, and is ornamented as follows:—Mark a small diamond in the centre of each swell, then cut it out and keep the piece by. Next, out of thin, soft, coloured leather or American cloth, cut a piece

twice or three times the size of the diamond removed, and place its centre over the hole from the under side; press it down into the hole, and put the diamond first made over it, exactly opposite the place from which it was taken. Beat it down into the hollow, with the coloured leather above, and there will then be a coloured diamond on the surface of the cheek; both cheeks can be made alike. Now place a piece of thin leather under the cheek, and stitch round the diamond pattern and along the edges of the cheek; then rub, and give the edges a neat finish.

For a stallion bridle, the front should be cut the same length as an ordinary bridle, or a little longer, and should be covered with fancy leather and ornamented with a pair of rosettes and streamers, which can be either made or purchased. The noseband also may be ornamented in the same way as the cheek, the front being scalloped and each swell ornamented.

Let the throat lash be cut $\frac{3}{4}$ in. wide, and have a buckle for the billets and top of the cheeks; for this, the headpiece must be wide enough to cut a 1-in. and $\frac{3}{4}$-in. strap, the latter for the throat lash and the former for the cheek. Consequently, the width of the headpiece must be $1\frac{3}{4}$ in., but as this size might cause the animal pain at the base of the ear, cut out a slanting piece on the front and back from the end of the slits opposite the ears.

There must also be a chape and buckle in the centre of the headpiece, and a drop with an ornament hanging down on the forehead. Line the drop, and make a loop for it under the forehead band.

As a rule, there is a riding rein like that for a snaffle, which can be fastened to the roller if not used for riding. Or, again, the rein can be made with a short piece on both sides, and a

buckle and loop with runner, 1 ft. 3 in. long altogether, and with a centre piece to fasten in each buckle on the short pieces. There should be a dozen holes on each side of the centre part, so that it can be shortened on each side when fastened to the roller.

A leading rein must be made, with a safety bar and a check chain in one end and a buckle and long billet in the other; the leather must be $1\frac{1}{8}$ in. wide and 7 in. long. The bridle buckles should be either fancy whole buckles or Scotch brass.

A breastplate may also be made for a stallion; a wavy pattern is selected, so that there will be two or three swells in the sidepieces, which are ornamented with patent coloured leather like the cheeks. Small straps also are placed at the top to fasten to the roller, but must be about 6 in. longer.

In place of a ring on the chest, cut the points of the two sidepieces slanting on the inside, so that they will meet together in a V-shape on the chest. The strap which runs between the legs to the girth can then be stitched on the joint, a fancy pattern being cut on the end, with a metal ornament in its centre to match the buckles. With worsted webbing make the roller long enough to fit the horse, the width being 6 in., and there must also be a 1-in. dee behind to the buckle crupper.

The chape which fastens the crupper dee must run on towards the front, with a 1-in. roller buckle in the centre and a loop; the other part will form a billet to hold the rein by the aid of the central buckle. There must also be two dees, one at each side, fastened with a chape to secure the breastplate straps. It is also advisable to place another dee on the near side under the pad for buckling the billet of the leading rein; and two straps, about 2 ft. long, should be fastened, one on each

side. Thus, when the attendant carries a coat or feeding bag, he can strap it on the horse's back.

Under the strap place a small extra one about 6 in. long, with holes in it; this rolls up inside the big strap, being buckled over it at the end. The crupper must be made with a body 2 ft. long. Having slit 6 in., and made a dock, put chapes and buckles on each end, and cut holes in the slits to fasten the dock to them by the buckles.

The billet is made 1 in. wide, forming one piece with the lay on the body of the crupper; thus, it must be longer than an ordinary billet, say about 4 ft. Place the buckle at a distance of 4 in. from the point of the body, with one loop in front and three loops behind; let it be stitched from underneath like a gig crupper, but without leaving an opening. Finally, make a runner loop on the billet.

CHAPTER VII.

BREAKING-DOWN TACKLE.

BREAKING-DOWN tackle is made in the same style as the stallion outfit described in the previous chapter, but it has side reins to fasten the horse's head on each side of the roller; this part may be dispensed with for a stallion, but is indispensable for horse-breaking, as the horse's head has to be kept steady and under firm control. The noseband must also be made stronger, with a dee fastened in the centre at the front for hooking the leading rein, the dimensions of the last being 9 ft. by $1\frac{1}{8}$ in.

Just as the chief feature in a stallion outfit is ornament and show, strength is the characteristic of breaking tackle. Girth and crupper are made in the same way, but proper breaking tackle (Fig. 21) has a cavison iron and dumb jockey.

The cavison iron (Fig. 22) can be purchased ready-made; it acts as a noseband, being strong to hold the horse's head steady. In the centre is a ring, which turns like a swivel, and another ring is placed on each side; there is also an opening at the sides of the iron to fasten the cheeks, and one at each end for the straps running below the jaw.

Begin by covering the cavison iron with thin brown leather, and herringbone-stitch it underneath out of sight; then make holes in the leather opposite the openings in the iron. Adjust two cheeks 7 in. by 1 in., then a runner and buckle with a loop at the top.

In the centre of the cavison iron a 1-in. strap,

20 in. long, when passed round, ascends the face and buckles in the centre of the headpiece. It must be turned in sufficiently at one end to go round the iron, and leave enough for stitching it together at the upper side.

When placing it round the cavison iron, slit it in half far enough to go over the ring in the centre; then put it round, with half the slit on each side of the ring, and stitch it above the iron, with a hoop under the forehead to allow it to pass.

In the next place, adjust a strap 9 in. long in the off side opening at the end of the cavison, and another 5 in. long, with a buckle, loop, and runner, on the near side. Then make a pad as for a cart winker cheek, but longer; this pad must run all along the inside of the cavison iron, and reach about 1 in. beyond at each end, being slightly wider when stuffed and flattened. Do not make it clumsy and thick with stuffing.

Four $\frac{1}{2}$-in. straps will be needed, long enough to pass round the cavison iron, with a few holes punched in them; stitch one at each end across the pad, and one on each side of the central ring which fastens the pad.

The head straps, made of good leather, are like those for stallions, with a chape and buckle in the centre to fasten the strap from the cavison iron to the face. Make the strap 2 ft. 4 in. long, so that it will fit a horse of any size, and slit it 8 in. or 9 in. on each side, so that, when cut, it is $1\frac{3}{4}$ in. wide; it can be narrowed in the centre between the slits.

The foreband is made like that for a stallion. Having made the throat lash 1 ft. 8 in. long, when turned in, and $\frac{3}{4}$ in. wide, put a buckle, a loop, and a runner at each end. If required for extra safety, a $\frac{5}{8}$-in. strap may be placed on each side of the cheek, 6 in. long, and stitched in with

the chape at the top. Slant each strap slightly downwards, and make an extra throat lash, $\frac{5}{8}$ in. by 1 ft. 4 in., to buckle to the straps. With two throat lashes the bridle will be firm and safe on the horse's head. No bit is employed with the cavison iron, but if straps are added to the cavison iron the bit can be attached to them.

A Corbett martingale, with cavison iron to hold the horse's head down, can be employed; fasten it to a strap to pass under the belly, and fasten

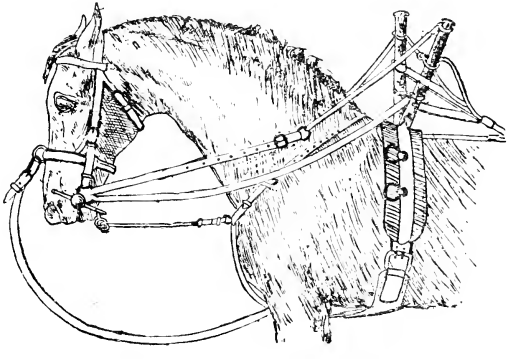

Fig. 21.—Breaking-down Tackle.

round the girth, or to a dee with a shorter strap, the dee being placed at the joining of the two sides of the breastplate on the chest. The fork on the end fastened by the horse's head consists of two short chains, which can be secured by two spring hooks attached to them in the side rings of the cavison iron, one on each side.

The style of rein depends on the make of the dumb jockey, which must be bought ready-made. As a rule, however, the reins must be strong, and at least 1 in. wide.

For preparing a double-horned jockey, rings

will be needed at one end of each rein to pass over the horns, and a ring about 1 ft. 6 in. lower down is stitched to both parts. On the end of the fore part of the rein there must be a billet and buckle to fasten to the side rings of the cavison iron, and a buckle on the other end with two runner loops, this end being fastened to the ring in the other part of the rein, and then put through runners and buckled. Thus, it can be shortened to suit the size of horse, and is fastened exactly like a bearing rein, but downwards instead of upwards.

Two other similar straps must be made, with a ring in each to put on the horns of the jockey,

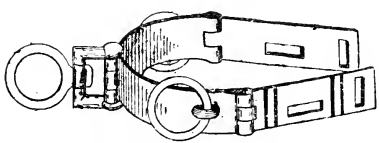

Fig. 22.—Cavison Iron.

both the straps being joined in one ring at the other end; these fasten the crupper, which is 2 ft. 6 in. in length in the body, and is slit 8 in. along one end. Beginning at a distance of 2 in. from the slit, narrow it down to 1 in., and then put a buckle with two runners that end after the fashion of a bearing rein, to secure it to the ring in which the two straps are joined.

Make a thick, soft linseed dock, and stitch one end of it to the off side slit, and lengthen the other slit slightly by adding a 3-in. piece, in which a few holes are punched. Place a buckle and two loops on the near side of the dock, and, having bought the dumb jockey, make a panel for it, and also adjust a girth.

The panel must be made on the same principle

as the cavison pad, the centre being stitched somewhat better, and the length extending beyond the point, while the width is a little greater than the jockey seat. Quilt it in a straight line on both sides, placing a tuft of flock under the stitch on the panel face.

If the jockey is not prepared for fastening it, make some straps like those for the cavison iron to go round the jockey. Adjust two straps, $1\frac{1}{8}$ in. by 1 ft. 8 in., one on each side of the jockey, for buckling the girth, this being 2 ft. by 2 in. Then fix a chape and two loops with a $1\frac{1}{8}$-in. roller buckle in each end on the flat of the girth, without turning the girth itself down for chapes.

Let the breastplate be made like that for a stallion, but, instead of joining the sidepieces on the chest, a ring may be adjusted, as previously explained, for fastening the Corbett martingale, instead of using a dee as when the sidepieces are joined.

CHAPTER VIII.

HEAD COLLARS.

HEAD collars, also called headstalls and stable collars, are made in various ways, and one of the most useful styles will be described in this chapter.

For a Newmarket head collar (Fig. 23) three head collar stop squares, a $1\frac{1}{4}$-in. tinned roller buckle, and a $\frac{3}{4}$-in. buckle will be required. Make two short straps 1 ft. by $1\frac{1}{4}$ in., and turn them in to 5 in. long, thus having 1 in. or a little more for overlap. Having shaved the ends, prick them eight to the inch, and put one square in the centre between them, and one in each end, with the stops on the same side.

Cut a strip of leather and lay it along the centre of each to raise the stay in the middle. Stitch them with beeswax thread, three-cord hemp, and make a strong cross-stitch at the end of each line, finishing carefully. Now cut the noseband 1 ft. 3 in. long when turned down, and, after preparing it, put one end forming a chape in each of the end squares in the shortstays. Stitch two rows along the edges of the turn-down, and trim the ends neatly.

Then cut a pair of cheeks $1\frac{1}{4}$ in. by 8 in. when bent in both ends, and prepare one end in each for a buckle, shaving the points of the other turn-down. After placing a runner on each cheek and a loop and buckle on one end, stitch the opposite ends to the two outer squares. Then cut the short upward stay; this is stitched behind in the centre square, and the throat lash runs through at the other end, the length when doubled being

about 4½ in. An opening is left in the top for the throat lash.

The forehead band may next be cut and made in the same way as the snaffle bridle forehead band. The top strap must be cut 2 ft long by 1¼ in.; when finished, punch about four holes on both sides. The throat lash is 3 ft. 6 in. by ¾ in.,

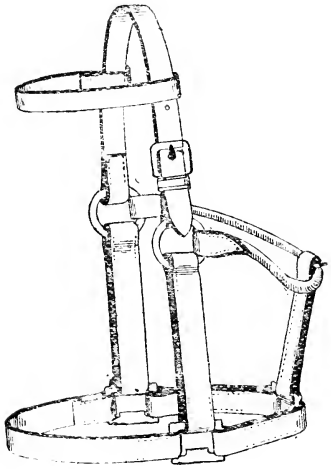

Fig. 23.—Newmarket Head Collar.

with a roller buckle of the same width, and a loop and runner, and with about nine holes in it.

Put the forehead band on the head strap, buckle it on both sides in the cheeks, and run the throat lash from the near side through the opening in the upward stay and under the head strap, then through the opening in the forehead band on each side, bringing the point down to the buckle on the near side. When the head collar is made with only one cheek on the near side, the

strap situated on the other side should be 2 ft. 9 in. long.

The Albert head collar (Fig. 24) is made as above described, but always has two cheeks, which must be turned down to 6 in. long; it is either lined through or the chapes are stitched at each end, these being placed in the side square at the bottom, with a 1½-in. ring in the other end of each.

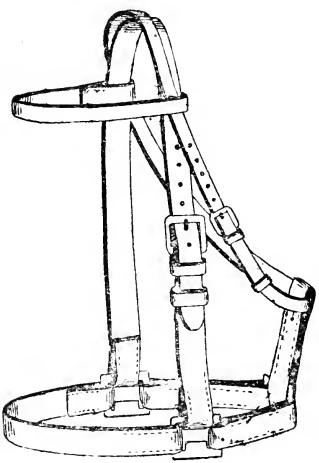

Fig. 24.—Albert Heal Collar.

The throat lash may then be run from one ring to the other, and rounded by placing a piece of cord inside; it must be passed through the opening at the top of the short stay, and its length, after turning down the chapes in the rings, must be 1 ft. 6 in.

After cutting a piece of leather 1¼ in. by 5 in. turn it down double, and let it overlap 1 in., and put one end of it in the ring on the near side, and

a buckle in the other end with a loop below, stitching it firmly from the under side.

The head strap must be cut the same width and then prepared; let it be 2 ft. long when turned in at one end, and stitch this end to the ring on the off-side, perforating it with six holes. The forehead band must be 1 in. wide. Run the

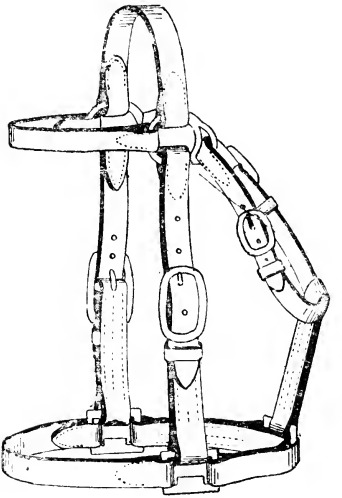

Fig. 25.—Queen's Pattern Head Collar.

head strap through both openings in the forehead band, and finally buckle it in the near side.

Head collars are made with brass or tinned fittings, the brass being either plain or whole fancy pattern, and the cheeks lined or single.

The Queen's pattern head collar (Fig. 25) is made with whole buckles placed on the cheek and not in the ring, with a chape, as in the Albert head collar. There must be a strap on each side, 6 in.

long, to buckle to them, and a centre piece across the top of the head, about 1 ft. long, turned down from ring to ring. On the ring there is a collar to stitch to the throat lash straps; it is 7 in. by $\frac{3}{4}$ in. wide when turned down, the throat lash, with buckles on each end, coming through the back stay 1 ft. 6 in. long, and being the same width as the straps.

The forehead band, 1 ft. by 1 in., is turned down and stitched opposite the straps at the front of the ring; for a good head collar it should be made of buff leather. A length of 6 in. will be sufficient for the cheeks; the rest of the work has been already described.

The head collar reins, 5 ft. by $1\frac{1}{4}$ in., are made of strong single straps, with a buckle loop and billet at one end, or part strap and part chain; the latter is attached to the head collar either with billet and buckle, or with a spring hook and a 3-ft. strap stitched to the other end. The ends of the straps are narrowed in both styles to run through the manger block, and a knot is made on the other side.

Some head collar reins are also made of ropes with a buckle chape and billet at one end for fastening to the head collar; others are all rope with an eye for the passage of the end of the rope after it has been run through the head collar square; then it is knotted below the block in the other end.

Pillar reins are made in two styles; the first has a buckle and billet at one end and a pillar rein spring hook in the other; the second is white cord with a buckle and billet and hook at the other end, the leather being 2 ft. 6 in. by 1 in. The reins are employed to fasten the horse in the stall with its head outwards, when harnessed to go out; and they prevent the horse from eating and keep it from the dirt. The billet end is fastened

to the stall post on each side, and the hooks in the bit on each side of the horse's head.

Not much need be said with respect to the use of the head collar, its alternative names, "head-stalls" and "stable collars" sufficiently indicating its purpose. It serves merely to fasten up the horse in the stable. Several styles—the Newmarket, Albert, and Queen's pattern—have been described in this chapter, and each has its own advantages in certain circumstances. It has been said that the best kind of head collar is that with a round throat-lash, from which it is next to impossible for the horse to free himself; at each side there should be a ring for the reins to fasten into, and to the end of the reins a wooden log or ball should be attached.

CHAPTER IX.

HORSE CLOTHING.

HORSE clothing is made of many different materials. Kersey, fawn rugging, princess check, and fancy checked and coloured linen stuff answer for day use, and for dust covers in the stable; the shapes and patterns also vary.

The quarter sheet (Fig. 26) is made with only a slight cut backwards towards the shoulder, and a piece of the same material is placed from the off side at the front, with a strap 1 ft. 9 in. by about 2 in. on its point to buckle in the near side where there is a chape and a buckle. The sheet itself falls down straight from the shoulder on each side, there being a belt across the chest to hold down both sides.

The breast cloth (Fig. 27) is made to cover the front of the chest and to run up the side of the neck on each side in a point; there is a buckle and chape to fasten to two 1 ft. 3 in. by 1 in. straps coming down from the shoulder of the sheet to meet the buckles. The breast cloth must be in a line with the edge of the sheet at the bottom.

The padcloth (Fig. 28) goes under the body roller, and is about 1 ft. 3 in. by 1 ft. Use the same material as for the sheet, and after rounding the corners neatly stitch on the inside, straight with the edges, a piece of hogskin, of a wavy pattern and about 2 in. wide. Put one piece at each end in the centre, 7 in. long, and one on each side of the centre.

A hood is needed to complete the suit. A suit-

able shape is shown by Fig. 29. The hood must be cut to the shape of the horse's neck and head, from a point about $5\frac{1}{4}$ in. below the eye on the nose, then along the ridge of the head and neck

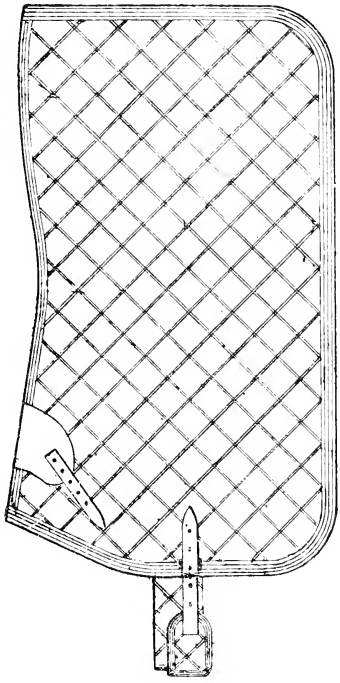

Fig. 26.—Quarter Sheet.

to the shoulder, where it should cover the front of the sheet well. Cut the holes for the ears, and make covers for them, the front part being about 1 in. larger than the face of the ear all around, and the back part large enough to pass round the back

of the ear, and allow it to enter easily. Stitch the edges, whipping them together; stitch also at the bottom round the hole, all the stitches being on the outside. Take care to put the front cut of the cloth opposite the front of the ear.

Having made two holes, right opposite the eyes, cut the hood under the neck all round the throat and down under the head, so that the two sides meet exactly in the centre. To join and bind them, whip-stitch the two parts of the sheet to-

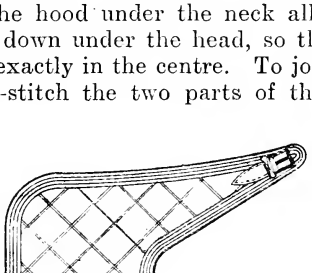

Fig. 27.—Breast Cloth.

gether along the back, and then put a piece across underneath the shoulder to come down on each side about 1 ft.; let it be pointed at the ends, the width in the middle being about 9 in., and all in one piece to strengthen the point at the shoulder.

The padcloth (Fig. 28) is cut in one piece, but the pieces of hogskin must be stitched in neatly, having been previously pasted on and dried. The breast cloth is cut in one piece, but the hood is in two pieces, and sometimes in four, as pieces are

put on the side flaps to increase the size at the sides.

Whip the edges together level along the top of the neck and over the head, down the front of the face. If a piece is placed anywhere else, let it be joined in the same manner, and always bind the joint, stitching it on both sides; cloth, patent, or Newmarket binding can be employed for binding. To bind the breastcloth, padcloth, and hood along the edges, cut the cloth 1¼ in. wide, and turn it round the edges just sufficiently to catch the first row of stitching about ¼ in. from the edge. Draw it down as flat as possible, and stitch another row along the inner edge of all parts of the

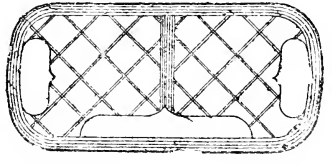

Fig. 28.—Pad Cloth.

binding. When it puckers too much at a sharp turn, as at the throat of the hood, the puckers may be cut out and then stitched edge to edge.

A strip of cloth about 1 in. wide must be put across the centre of the padcloth, the ends passing under the hogskin piece and binding. Then add another strip along the centre of the sheet where it joins, and another along the joint on the top of the neck of the hood, the ends being always placed under the binding. Now place flat strips, ½ in. wide, along the joints at the side and the points of the ear-pieces, then round the bottom to cover the ends and the joint. This work can be done by machine.

The only difference in a Newmarket sheet is that

it is cut on a curve from the shoulder to the front at the centre of the chest where both sides meet; there is no breastcloth, the two sides being united by a strap and buckle. The last mentioned must be on the near side, and the shape like that for a saddle girth. Line the shoulder and the corners of the chest where the straps are stitched with a piece of rugging underneath.

The hood is fastened under the jaw with a

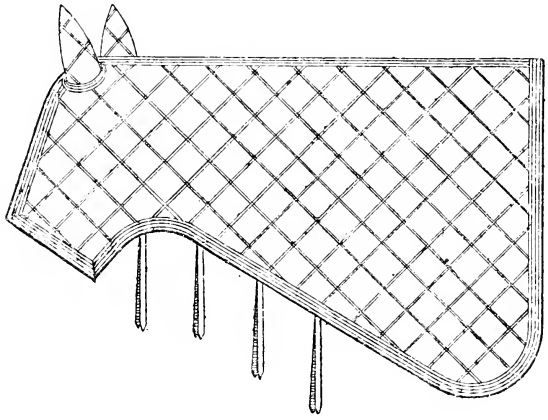

Fig. 29.—Hood.

small strap and buckle; cadez strings are run from this point to about half-way down the neck on each side to tie together.

The sheets can be bound in two colours, if preferred, or with patent bindings, one colour along the edge and the other by its side. If red cloth is employed for binding, bind it in all along and then put blue cloth, about $\frac{7}{8}$ in. wide, just to cover the edge of the red binding. Catch them both under the stitch with the first row of stitching,

and finish the upper edge of the binding in the same style.

Princess check of various colours is fine worsted material, very light in weight, and of very showy appearance. It can be bound with fine worsted binding of one or more colours. When cutting the sheet for either of the above, the back must not be made quite straight, but should be scooped out

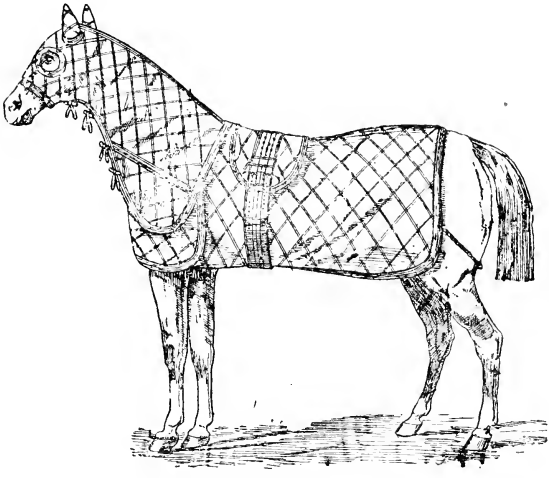

Fig. 30.—Horse Covered.

a little behind the shoulder towards the loin ; leave it full at the rump and slanting a little at the end. Fig. 30 illustrates the horse covered.

Body rollers (Figs. 31 and 32) are made of worsted, linen, union, webbing, or leather, with one, two, or three straps, a full-sized roller being 6 ft. 2 in. long. The pad is placed about 10 in. from one point, and the shortest end of the roller near the pad must be bound with leather and stitched with single thread ; let it be 1 in. wide

on each side, and bind the other end, the binding being 1 in. wide on the front as at the short end, but line the girth for about 6 in. below, and stitch it along the edge of the roller. Then raise a stitch over the edge of the leather in the girth without running through, and with a lead-pencil mark a line

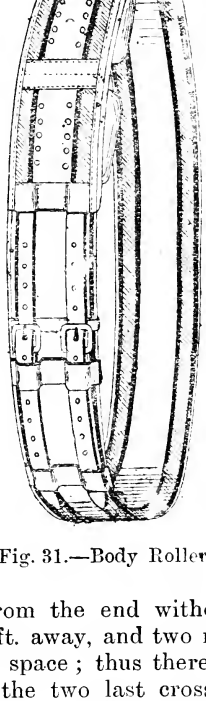

Fig. 31.—Body Roller.

across 10 in. from the end without lining, then a second line 1 ft. away, and two more $5\frac{1}{4}$ in. from each line in the space; thus there will be a $1\frac{1}{2}$-in. space between the two last cross lines.

Cut out a piece of stiff cardboard to the same width as the roller, and 1 in. below each of the extreme cross lines thin the edges. Next cut a

piece of white serge (when the girth is leather use basil or hogskin) to reach 2 in. below the two end lines, and ½ in. wider on each side of the girth. Narrow the centre of a piece of hogskin, 1 ft. 4 in. by 1¼ in., to a little less than half opposite the space between the two inner lines.

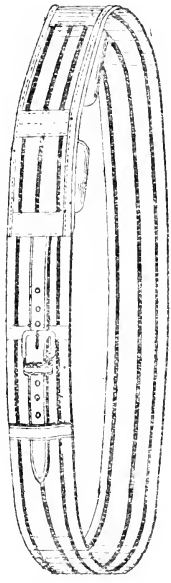

Fig. 32.—Body Roller.

Having rounded the four corners, cut slanting from the extreme rounded part towards the ends until the hogskin is about ½ in. wide at the point. Two of these pieces will be needed to face the panel on each side. Then turn down the serge along the edges lengthwise just ¼ in., and back and whip it to the facing along the shaped edge

—not the straight edge—placing them centre to centre; the full and narrow parts of the facings must correspond on each side.

Two pieces of leather must be cut, $2\frac{1}{4}$ in. deep and of the same width as the roller; crease them along the two longer sides with a hot iron, and then cut two similar pieces of basil and two strong $1\frac{1}{4}$-in. brown leather straps, 1 ft. 6 in. long. After pointing one end and shaving the other, crease them double with a hot iron and make eight holes in each. Place one of the pieces of basil underneath, level with the edges of the roller, the top part reaching a little above the line near the shorter end from the pad.

The two straps are placed within $\frac{1}{4}$ in. of the line, pointing towards the short end of the roller, and are then stitched down firmly through the roller and the under piece of basil. Next the first two pieces of hogskin of the same width as the roller are placed one on each end of the part to be occupied by the pad, their upper edges reaching about $\frac{1}{8}$ in. above the two end lines. The other piece of basil is placed under the end where there are no straps.

After tacking down the basil, cut a piece big enough to pass across the roller from side to side and $1\frac{3}{4}$ in. wide; crease it lengthwise and tack it in the centre to cover the two central lines. Now place the piece of cardboard underneath equidistant at both ends from the centre, and tack it down.

The other piece of hogskin goes at the other end of the pad to correspond with the similar piece on the opposite side, and cover the stitched ends of the straps.

The two pieces at each end can now be stitched through the roller and cardboard along the upper cross line of each; also stitch the ends of the centre piece of the edge of the roller and card-

board, leaving the two cross lines unstitched. Take the serge lining and facing and put them centre to centre at each side of the roller; then whip the facing to the roller along both edges through the web and cardboard. Take care that the ends of the serge and facing reach equal distances just below the cross line stitched in the two end pieces.

A thin strip of hogskin should be cut for binding, about ½ in. wide. Both edges must be bound from the extreme end of the pieces of leather at each end of the pad to the end of the other piece at the opposite extremity of the pad. Distribute the lining equally on both sides of the centre, and stitch the two cross lines in the middle piece of hogskin from one side to the other, thus making two separate compartments.

Two rows of stitching must now be made through the leather at the strap end of the pad downwards between the straps and close to them; then make two corresponding rows in the leather at the other end of the panel. This can now be stuffed with flock through the opening at the bottom; both sides must be stuffed firm and level to the same size, and the edge of the serge turned in at the bottom. Raise a stitch to fasten the leather lining on the roller opposite the serge.

Then cut twenty small round or scalloped pieces of leather, a little smaller than a threepenny bit, of coloured roan or hogskin; quilt the panel with five stitches at each side on every part, making twenty in all. They must be in a perfectly straight line, and 1 in. from the edge, the needle being driven from below, then through the small circle of leather, and down through it again and the roller.

Having then firmly knotted it to the panel below with a small tuft of coloured wool under each knot, cut two chapes for two 1¼-in. buckles,

and two loops. Stitch the chapes with the outside of the buckles flush with the end of the roller, and straight to the straps.

Another loop must be cut sufficiently long to reach across the girth; finish it neatly and stitch it across at both ends. Make also two cross rows in the centre, with sufficient space on each side of them to allow the two straps to enter. This last loop must be about 6 in. lower down than the chapes. Having blocked, creased, and finished the loops properly, place a fancy stamp in the centre of each.

The above instructions apply also to the making of a stallion roller, but this must have dees, which are set in before the panel is adjusted; then the binding can be placed round or under the chapes. Wider web may be employed, and three straps instead of two; also, there may be whole brass or silver buckles to fasten them, instead of plain buckles, and two long loops below the chapes instead of a buckle.

The leather girths are sometimes made in the same way, except that there need not be any lining under the buckles when they are firm and good.

Surcingles are made for the same purpose as rollers, but have no panels.

CHAPTER X.

KNEE-CAPS AND MISCELLANEOUS ARTICLES.

KNEE-CAPS (Figs. 33 to 35) are of felt, fawn rugging, kersey cloth, union, buff leather, black rubber, etc.

It is better to buy the pads, but they can be made if so desired as follows: When there is no press available, damp some half-curried leather, and beat it as a shoemaker beats boot soles until it acquires the hollow cup shape. After it has had time to dry, cut it to a wide oval shape, about 5 in. by 4 in., and make the cloth, kersey, or leather about 8 in. at the top and 9 in. deep.

Round the bottom part, and bind all except the straight top with cadez patent binding or cloth; the buff need not be bound. Then, on the centre, place the leather block, with a piece of shaped cardboard underneath, pasting the two together, and pressing down the cloth to the hollow. Stitch the blocked leather to the cloth, about $1\frac{1}{4}$ in. from the top and $1\frac{1}{2}$ in. from the bottom, and cut a piece of leather $1\frac{1}{8}$ in. wide and 1 in. longer at each end than the cloth at the top. Make a hole at each end 1 in. from the point for a $\frac{5}{8}$-in. strap, placing a chape, buckle, and loop in the hole at one end, and a strap of similar width, 9 in. long, in the other hole, and stitching them both firmly.

If preferred, a small square may be placed in the strap side, with a chape to fasten in the hole, a second square being used for fastening the strap, with an indiarubber ring $\frac{5}{8}$ in. wide between the two squares.

A piece of chamois leather will be needed to make a roll at the top of the same length and

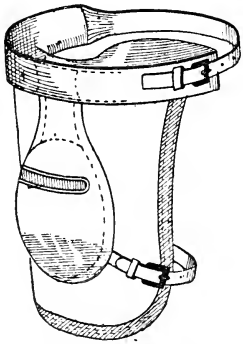

Fig. 33.—Knee-cap.

width as the strap, the chamois leather being stitched all along through the top leather and the cloth. The chamois must hang down in front

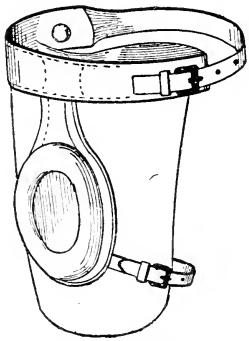

Fig. 34.—Knee-cap.

of the knee-cap while this is being done, the three edges being placed together; thus, they

can be stitched, the top leather reaching to the same distance over each end.

Turn the chamois leather over the top towards the bottom, and stitch it along the bottom side

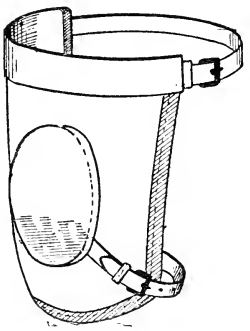

Fig. 35.—Knee-cap.

of the top strap through cloth and strap, leaving it rather slack. Then make two rows of stitches across in the centre, leaving an opening of about

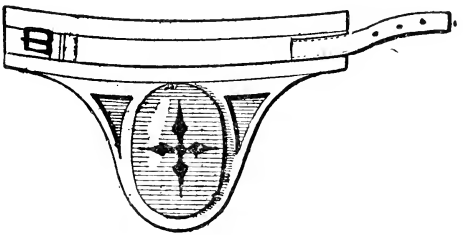

Fig. 36.—Fetlock Boot.

1½ in. exactly in the centre between the two cross lines.

After stuffing the two parts of the roll from each end with flock, close the ends by stitching

the chamois and top leather together. Next put a $\frac{5}{8}$-in. chape buckle and loop at the bottom of the block pad, making them slant downwards slightly, with a strap 10 in. long at the opposite side for

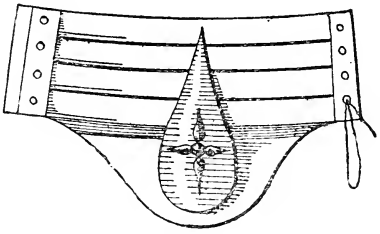

Fig. 37.—Fetlock Boot.

fastening. The buckles must be reversed when making a pair, each buckle being on the outside.

Sometimes the best knee-caps have the knee

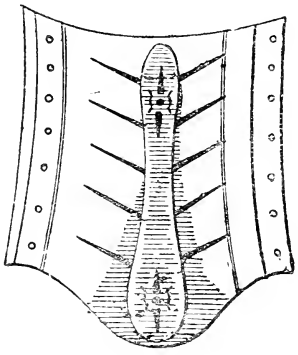

Fig. 38.—Lace Speedy-cut Boot.

block cut with a piece to come from the top to catch the top strap, and to be stitched under it; this is a great improvement, even when there is a separate piece of leather.

Fetlock boots (Fig. 36) are made of leather, indiarubber, cloth and leather, or, as in Curtis's patent, of zinc and leather, according to the part on which the horse catches itself. It is scarcely worth while to make them, as they can be bought in all varieties and patterns ready-made, like perforated lace leggings, lace fetlock boot (Fig. 37), roll-cutting boot, top-roll fetlock boot, back sinew boot, lace or buckle speedy-cut boot (Figs. 38 and 39), over-reach boot of indiarubber to slip on over

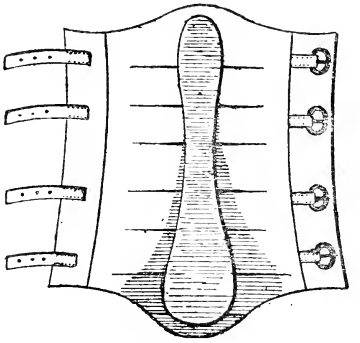

Fig. 39.—Buckle Speedy-cut Boot.

the hoof, and indiarubber ring boot (Fig. 40), either solid or hollow.

Fetlock boots made by the saddler should have a cup just like the knee-cap to cover the fetlock. A side leg boot, made for a horse that catches above the fetlock, must be cut to reach almost from joint to joint; it is stiffened along the centre inside, and has three straps and buckles on the outside.

Hoofswabs are made of felt or leather, the sole being cut the same shape as the hoof; leather is placed round to cover the top of the hoof, fitting

tightly and slanting upwards, and is fastened behind with a buckle and loop.

Poultice boots are made in the same way, but have a piece of strong canvas above to keep the poultice round the top of the hoof; each is fastened behind with strings at the top, and a strap with a buckle at the bottom.

False collars (Fig. 41) are very valuable when all other means of easing a collar have failed. They are made to fit inside a collar, but should not be so thick as to interfere with its size, even when quilted. Some are made of single leather,

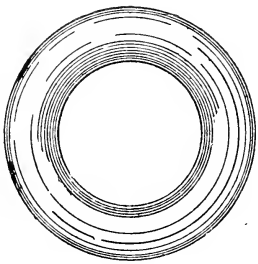

Fig. 40.—Ring Boot.

others of one thickness of felt, and some are quilted. All are alike in pattern, but the quilted ones need a little allowance for the stuffing and quilting, say 1½ in. in the width; the shape is similar to that of a collar lining.

A brown paper pattern should be cut out first to fit the collar, and then be manipulated so that the creases come out in the trimmings. Run a single thickness forward quite to the front to cover the wide part of the body of the collar well, and come out beyond the body all round about 1½ in.

The single leather and felt collar must be cut to pattern, and seamed both ends together, with

a strap and buckle at both sides and at the bottom to keep them in place. Crease the leather double with a hot iron along the edges, and when felt is employed it is advisable to place a piece of thin leather over all the joints and stitch it on each side of them, having previously joined the felt end to end.

The felt must always be cut lengthwise, not crosswise, as it will only stretch across.

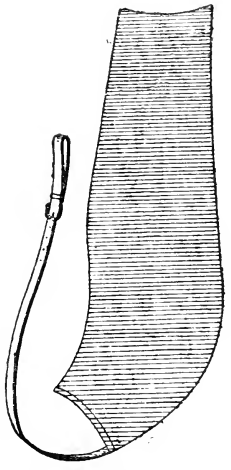

Fig. 41.—False Collar.

To make a quilted collar, cut the leather 1½ in. wider, but do not let it reach beyond the forewale outside. When cutting it, allow about 1½ in. more in width than the finished size. Four pieces of basil will be needed, two for each side reversed; each pair must be stitched together, whipped over the edges with the flesh outside and the ends stitched together, so as to form a bag from end to end. Having cut a hole so that it will be out

of sight when finished on the side next the collar, turn the collar inside out, and cut a similar, though smaller, hole in the other side.

Both sides should be stuffed separately through these holes. A piece of strong, fine cane will be required, long enough to run all round the hollow between the body and forewale of the collar inside, meeting in the point at the top. Put it through one of the holes in front of the false collar, and spot it in, drawing the leather tightly over it all round. Thus, when the collar is finished, the cane will fit into this hollow with a spring, keeping it in place close to the body.

After that, stuff the collar with fine flock, putting more stuffing at the draught if necessary, and then quilt it and stitch up the holes in the sides. Run a row of quilting along the outside near the edge first, and then two rows inside towards the cane, a very small tuft of wool being also placed inside under every stitch,

The thread must not be cut and knotted at each stitch, but should be just pulled home, and the thread run from one stitch to the other; it must not be baggy, but smooth and even all over. Finally, place it in position, and catch it as firmly as possible with the spring cane in the hollow under the forewale.

CHAPTER XI.

REPAIRING HARNESS AND SADDLERY.

THE renovation and repair of harness and saddlery will be treated in this chapter. It is hardly necessary to point out that it is economical to repair harness and to keep it in good condition, rather than to let it be worn out straightaway and then to replace with new again. It always pays to attend at once to defective or broken parts, such a system saving time as well as money, and lessening the risk of accident that is ever-present where safety of life and limb depends on the strength of straps and buckles.

For the benefit of the uninitiated, the trade names of the many parts of a complete set of harness are given below, the letter references being to Fig. 42. A shows the blinker; B, cheek; C, front; D, headpiece; E, nosepiece; F, throatlatch; G, bearing-rein rounding; H, bearing-rein middle; I, collar; J, hame-tug; K, trace; L, backband; M, bellyband; N, saddle; O, flap; P, skirt; Q, swell; R, shaft-tug; S, saddle seat; T, terret; U, bearing-rein hook; V, breeching-strap; W, breeching-seat; X, breeching-tugs; Y, split hip-strap; Z, crupper; A′, crupper dock; B′, driving-reins.

When repairing trap or carriage harness of all kinds, such as reins, breeching straps, crupper billets, etc., shave the under side of the splice on the top and the top part underneath, making them as nearly as possible of the same thickness as a single strap.

A splice must never be stitched across in a single strap, but always forward along the strap. When, however, only two rows are made in a splice,

always put two or three stitches in the centre of the top lay of the splice at the point.

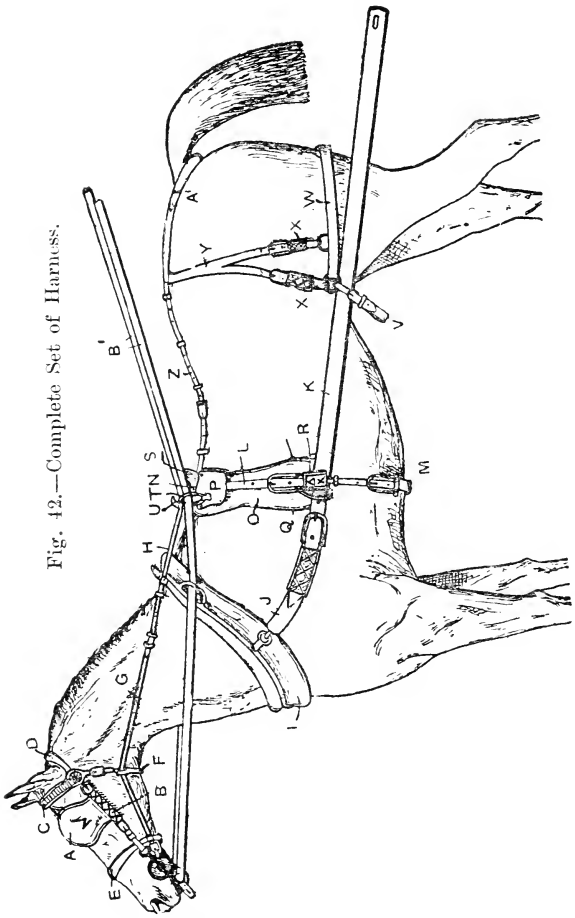

Fig. 42.—Complete Set of Harness.

To make a splice in a pair of reins, or where

the leather is of one thickness, only pare the ends and lap them as in Fig. 43.

The straps of the bridle have to be patched and replaced sometimes. When furnishing winkers with new chapes, make them like the old ones, and when treating a strap, shave the patch or splice as near as possible to the single thickness.

The bearing-rein rounding G (Fig. 42), when broken, is perhaps one of the most unsatisfactory parts to repair, because, its shape being round, sufficient cannot be pared from the old leather to give place to the new. The broken ends may be reduced a little, and the parts drawn together by stitches from one piece to the other and thin leather lapped round, extending 1 in. or so on each side, and stitched closely along the edge.

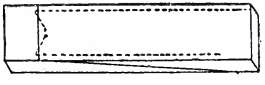

Fig. 43.—Spliced Leather Rein.

Chapes are put on head collar squares in the following manner:—Open the parts where the chapes are to be, and run them between the leathers, thinning the ends a little first, and making a strong cross stitch near the ends.

For lining shaft tugs, a somewhat frequent job, use, if possible, sole leather for the outer piece of lining. The stitches being made coarser than for a new tug, cut a groove in the outer lining all along on both sides, and sink the stitches. Never cut the old lining straight across without thinning its end and that of the new piece for splicing. It must overlap the old one, not merely meet it end to end.

In lining shaft tugs, try to make them level. Sometimes three or four thicknesses of leather will be needed, but the length must be regulated and

the ends of every piece shaved, so that, when placed together, they will run down to the thickness of the old parts. Always make the chapes long enough for such things as bearers and breeching straps, etc., shaving the ends to be joined to the chape, and finishing neatly.

The inside of shaft-tug R (Fig. 42), is specially liable to damage owing to constant friction with the shaft. In some cases only that part of the lining under the loop is worn away. To repair this part, take a piece of stout leather long enough to reach beyond each end of the loop, and stitch it on each side only where the loop is, with four rows at each end. Use the screw-race for making a groove in the leather, so that the stitches may lie well below the surface to prevent unnecessary wear. If the lining has to be continued all round, take out the old one and cut a strip about 12 in. long; bend it down, grain inside, 1 in. from one end; scoop out a piece in the middle of the bend for the heel of the buckle tongue to lie in, and pare both ends for a lap splice. When put into the tug, it will appear to be too long, but the thin end of the strip must be bent and fastened in its place by a nail on each side of it, and the lining then worked into place by rubbing the fingers round inside until it assumes its proper shape.

Forcing in the lining by this means makes the tug solid and strong. A strip of sole leather soaked in water and sewn in wet makes a better lining than harness leather where a tug is subjected to very rough wear. Use the tug clamp for any of this work. These special clamps are illustrated by Figs. 52 to 55, pp. 24, 25, of "Harness Making."

In the hame-tug J (Fig. 42) there is a clip (Fig. 44) with which to connect the tug to the draft of the hame. This clip sometimes snaps at one of the rivet holes and causes the leather to break. The

broken leather must be pared away from each side of the break laid on as described on p. 96 in repairing the middle of backband. Owing to the iron clip inside, this can only be sewn along each edge.

If the clip has become very much worn, it is best to put in a new clip at once, and so avoid further trouble. Rip the stitches holding the top and bottom pieces to the middle, knock out the two rivets which fasten the clip to the tug, and fix in a new one, forcing the prongs of clip together in a vice and riveting them firmly. New leather may now be put from the end of tug to the loop instead of splicing in a piece; and if this new piece is to go

Fig. 44.—Hame Tug Clip.

on the top of the tug, stitch the two inside rows first on the new leather before fixing it in its place.

Always trim and finish the work off neatly, and where the edges, as in this case, cannot be polished with a cloth, a finished appearance may be imparted by the free use of a smooth bone (the handle of a worn-out tooth-brush, for instance). The bone rubber is illustrated on p. 28 of "Harness Making."

Some parts of a set of harness being subjected to rougher wear or more intense strain, naturally get damaged much sooner than other parts. Say the end of a trace (K, Fig. 42) breaks at one of the holes. This may be repaired either by splicing the broken parts together, or by putting on a new point. The first method is not always satisfactory, because

when finished this trace will be shorter than its fellow.

In splicing the end of a trace, cut the broken ends off square, and open the one on the short piece by running a knife between the two layers of leather for about 3½ in. and separating them. Bend them well apart, lay over the edge of the bench, and with the round knife pare away until there is a gradual taper on each. Now take the long piece and pare the end away, top and bottom, until it resembles a wedge. This is fitted into the other part, and two or three nails are driven through to hold it whilst being sewn. The next hole towards the point should be level with the hole in wear on the other trace.

Lay both traces on the bench to see that all holes are even, or an unequal strain may sooner or

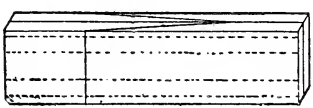

Fig. 45.—Spliced Trace.

later cause the shorter one to break, and probably give the horse a sore shoulder in the meantime. Full instructions for making threads are given in Chapter II. of "Harness Making." Judgment must be used in making a thread of suitable size. This will depend principally on the number of stitches per inch. Sew in the old holes, drive the awl straight through, and pull the stitches well in. Shave the edges evenly with the spokeshave, put on some dye, and rub up with a cloth to give it a polish. Fig. 45 shows this kind of joint.

To put a new point to a broken trace, cut off at the last hole, and measure it. A new point should never be put on between the holes, as the

splice would be stiff, and difficult to get through the buckle and loop.

Cut a strip of good leather with the cutting gauge, and from the thickest end measure off two pieces the length required. Cut the end of one piece to a point, mark it with the compasses, and prick it with an iron the same number of teeth per inch as the old stitching, using the small mallet for this purpose; pare the ends for the splice as just described, and tack the pieces together with a few nails. The bottom piece should be $\frac{1}{4}$ in. shorter than the top piece at the splice; this makes a more even joint.

After it is all sewn, lay it top side downwards on the bench, and with a stout round stick (a hammer handle will do) rub the stitches well down. Cut off the surplus leather at the point (bottom strip), run an edge-tool along all the edges, and with the spokeshave finish the edges to a crescent shape. Dye these, and, before rubbing them with a cloth, draw a piece of tallow along. This will give a nice smooth finish. Lay the trace on the bench and place the other above it; mark through the holes of this on to the new leather, and punch on the lead-piece.

In repairing thick backbands and traces, splicing should if possible be avoided. Shave both ends of the break, and just tack the ends together, then put pieces of leather at both sides until the required thickness is obtained, the pieces being shorter and thinner-shaved at the ends nearer the centre. As a rule, stitch four rows along the patch, and one or two stitches in the centre of the points. If the entire part, such as the holed part in a trace, is not worth patching, put in a new piece, keeping the old one to mark the new; the joint at the splice must be very neat, not thick and clumsy. In the same way, if the other end is gone, add a new piece, making it thicker than at the other parts.

When the centre of the backband is not worth patching, make a new centre, but generally the strap end and bellyband part can be used. Having measured the part, cut off and allow enough extra to make a splice in each end; put the strap in one end and the bellyband in the other.

A backband, L (Fig. 42) generally breaks at one of the tug buckle holes, or at some part near the middle where it passes under the saddle-skirts, P, or seat, S. This part of the backband is sometimes made up of three thicknesses of leather, and it may be that only the top or bottom strip is broken. Take off both tugs, lay the backband, broken side up, across the bench, and with the round knife skive out a piece about $2\frac{1}{2}$ in. each side of the break. Cut a piece of new leather to fit, and if it is for the top of the backband, mark the number of lines and prick them. See that the part under repair is of equal substance with the rest, then sew it and finish off.

Before putting the backband into the saddle, the off-side tug must be put on. The point of the backband is passed through the loop first, from the bottom, then over the tongue and through the buckle, when it is easily got into position. Then pass the point of the backband under the off-side skirt on the opposite side of P, and through to the near side. Buckle the other tug in its place.

If any difficulty is experienced in getting the backband through, bend the point down at the start, and if not successful then, put a piece of strong string through the first hole and pass the two ends of the string through; by this means it can be readily pulled into place.

The bridgeband is frequently torn across in some part or other of the body; to repair it, shave the ends thin, and join the break with a few stitches. New pieces must be put on both sides, and, when necessary, another in the centre. Let

the top lay be 1 in. longer at each end than the lower lay, and shave it thin at both ends. Next make four or five rows of strong stitches from end to end, but never stitch the patches across; also make a few stitches at the centre in the points, keeping to a uniform thickness as much as possible.

The above remark applies to the backband, bellyband, or crupper of the leading gear when they are torn. In case of chapes like those for bridgeband tugs, use strong leather, shave the ends, and let the upper side be a little longer than the lower; also thin the part put in a little.

Broken loops in harness frequently occur. To repair them, cut a piece of leather the same width as the broken loop. Its length should be reckoned at about three times the width of the strap it is going into. Take off the edges with a small edge-tool and rub them up; push one end half-way through the opening made by taking out the old pieces; sew in this side; then, turning in the other end, sew that also, running the awl in a slanting direction towards the edge as the middle is approached. Block it up on a loopstick, which must be the same width as the strap, warm the creasing tool, and mark the loop along its edge.

Surcingles and saddle girths often break in the centre; stitch the ends together, and make a basil cover tight enough to pass round them, stitching each side, and then put it over the end of the girth, making four or more rows of stitching along it.

In the skirt of the saddle, s (Fig. 42) a large stud or bolt is shown. Many saddles are made without this, and it often happens that the stitching at this part breaks away, and if not repaired at once is likely to lead to the whole of the saddle-top being pulled off.

To do such a repair, knock out the nail under the iron crupper loop and loosen the panel from the flaps o about half-way down one side. The skirt

can then be sewn down to the flap again. If the panel was fixed in with copper wire, a close examination of the old wire will give the size and method to be employed in replacing it in its position.

Very often the panel, especially when the saddle is old, is merely stitched to the flaps at intervals, four or five stitches being made at each place, and this is an easier plan. Fasten it under the iron crupper loop with a small clout nail padded with serge, and trim this off to a small tuft.

Re-lining collars and saddles is dealt with in detail in the next chapter, but a note or two on the subject may here be given. A saddle panel may need a new lining and stuffing. Begin work by removing it, and, if the back and facing are good enough, cut off the old lining close to the stitches running by the side of the facing, but let part of the lining and stitches be there to keep the facing in place. Cut the new lining as for a new panel, and tack it with hemp, turning in the edges and spot-stitching it down by the facing along both sides. On the outside, the stitch must be small and neat. Stitch the lining in at the top along the old marks, and whip it in at the bottom.

The panel is stuffed like a new panel, and for a good saddle is quilted and adjusted with wire, or spotted and stitched all along; for a common saddle, five or six stitches together here and there will suffice. When the back is good and the facing bad, stitch on a new facing with new cord, and stitch the lining like a new one.

Sometimes a saddle panel has to be stuffed and raised without lining; to do this, cut a hole across at the centre, and fill each end, levelling the stuff with the seat awl.

In repairing riding saddles, the same principles are followed as for making new ones; as a rule, the back of the panel can remain with a new panel

affixed, and also the hogskin facing. Remove all else, put in a new lining, and stuff like new.

When a riding saddle tree is broken, a blacksmith will often repair it, especially when the plate is broken, but it must be stripped and everything put back as before.

When a saddle needs a new tree, begin by taking off the old top, doing as little damage to the flaps and skirts as possible. The skirts can often be utilised again like the flaps, so that only a tree seat and cantle cover will be needed. Make it up like a new one, and damp the skirts and flaps to make them easier to handle; also remove the old nails from the leather before employing new ones. If the skirts are gone, new ones must be cut out to the same pattern.

When the cover of a collar forewale is worn in any way, put on a piece, and shave both ends well and thinly; then stitch it along the bottom of the forewale between the forewale and the body. If the lining is worn in some places, line it without taking off the old straw, and put in new flock; place the lining along the forewale, and stitch it with a lace-collar needle and handiron, turning it down to cover the stitches, and drawing it in along the old stitches in the sidepiece if necessary. A little fresh straw can be placed under the draught, a wisp or two being placed in with the stick, and hammered with the mallet to fill it and tighten.

The best plan, however, is to take the sidepiece off entirely, and make a new body as for a new collar, the sidepieces being damped and put back just like new ones. When the leather to which the lining is stitched at the forewale is worn too much, the stitches can be run through and out at the same side, as with false lining.

Collars also are half-lined, and a strip of new lining is sometimes placed under the draught; the straw and flock required are then put through the

opening. The last two methods do not interfere with the sidepiece; the lining is merely drawn to it and stitched on. The subject is dealt with more fully in the next chapter.

A collar can be reduced in the following way. Open the top, remove the top piece, and then, with pincers, pull some wisps from the straw in the forewale until both sides meet easily. Now stitch the ends together to the required size, turn down the sidepiece and lining, cut the straw in the body to size, fasten both ends of the body together, and put the sidepiece on as before.

To put a piece in a collar to make it larger, shave the ends of the forewale thin, and again remove a few wisps. Cut a piece of leather of the same width as the leather in the forewale, and stitch it, joining it well with the old leather and shaving the joint thin. Put in some fresh wisps and a short collar iron, one after the other, until the forewale is hard enough, taking care to join the straw well, so that there will be no hinge.

The iron must be beaten in with the straw on it by a mallet, as it cannot very well be knocked on the block. When long enough, close the top, and unless it is much enlarged, flock in the body will suffice to lengthen it. Stitch a piece of lining or basil to the new piece on the forewale, and fasten it in the shape of the body by stitching the other side; then stuff it tightly with flock. Join the top and put a cap on the forewale and a patch in the sidepiece of sufficient length to cover the new part.

Wtih regard to cleaning and renovating, it is obvious that harness and saddlery, to be maintained in good order, should be kept thoroughly cleansed from all dirt, whether splashings from the road or exudations from the horse.

For cleansing harness use warm water (not hot), a stiff brush, and a little soft soap. After well washing it, wipe with an old cloth, and before it is

quite dry apply a dressing of pure neatsfoot oil, and hang up for a few hours in the shade. It will then be found quite pliable, and if there is any objection to the dull appearance of the leather, it may be brushed over with a thin coat of harness composition and polished with another brush. A soft cloth will give it quite a lustre, and a set of harness treated in this way will always be found to look neat, and to last twice as long as it would if never cleaned.

The collar and saddle linings should be kept free from scurf and other dirt, either by applying a stiff brush or by scraping with a blunt knife, and should always be hung up and thoroughly dried before being used again. This careful treatment not only preserves the collar and saddle, but is also very beneficial to the horse, preventing sore shoulders and back, and tending to greater comfort altogether.

An occasional loosening of the padding by beating the lining all over with a thin stick will keep it soft and prevent irritation. All buckles should be unfastened, and the under part of each one thoroughly cleaned and polished. If only the parts in sight are cleaned, an accumulation of verdigris will ultimately destroy the leather where the buckle rests on it, causing it to crack across at the hole, with the possible result of a serious accident.

Where harness is required for daily use it is advisable to have an alternate set. Of course, this implies double outlay at first, but the advantages of possessing an extra collar and saddle will afford ample compensation.

Shifting the buckle to another hole occasionally is another means—small, but not to be despised—of extending the life of a set of harness; but in altering traces, breeching-straps, and such like, it is necessary to proceed equally on both sides in order to avoid unequal strain.

Where there is room for it, and where its cost does not preclude its use, a saddle-cleaning horse as seen in harness-rooms attached to stables might with advantage be employed. Such a horse may be a high table with substantial legs, these supporting, besides the table top, one or two shelves for holding miscellaneous articles. The saddle rest fits on the table top, and in section is shaped thus: ∧. It is desirable to add two side leaves so that the horse can be conveniently used for many purposes other than saddle cleaning.

CHAPTER XII.

RE-LINING COLLARS AND SADDLES.

BEFORE undertaking the re-lining of collars and saddles, all sores and abrasions on the horse, to which the collar or saddle belongs, must be noted and the collar or saddle marked, so that any cavity to be formed for the relief of these may be in the right place.

In the case of a collar, the best place for a guide-mark is on the afterwale C (Fig. 46).

A cart saddle usually hurts in the gullet under the bearing-rein hook or beneath one of the terrets, the discomfort being generally due to lack of sufficient padding. If it hurts in the gullet, it may be altered by padding the sides well; but if the injury is on one or both sides, then the stuffing must be removed, and the lining drawn firmly down to the back of the pannel.

The various parts constituting a collar are indicated in Fig. 46, in which A denotes the cap which covers the stitches made in joining the ends of the forewale B; the afterwale C is the outer covering of the body side. That part of the collar marked E is called the throat, and through the line F is the draught. The substance of the collar at F is greater than at any other part, the increased substance being necessary, not only on account of most of the wear falling here, but also in order that the tugs and traces may be kept clear of the horse.

When collars are very much worn down at the draught, it is sometimes necessary to place a pad under the point of the hame, so that the tugs may be kept clear of the shoulders. This pad may be sewn to the collar or kept in place by small straps buckled round the hame point.

When repairing collars, it is preferable to remedy any defect to the afterwale before the new lining is put in.

The materials employed in lining collars and saddles are (1) collar cloth, (2) serge, (3) leather. For cart collars and saddles the first is used, and for cab and gig work either serge or leather.

In re-lining a cart collar the lining is not carried completely round the inside; it seldom reaches beyond the points indicated by x x (Fig. 46). Each end of the lining is gathered to fulness, and, when stuffed, keeps the collar clear of the horse at the throat and on the withers.

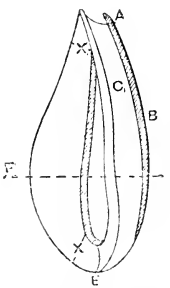

Fig. 46.—Cab Collar.

Cab and gig collars are not re-lined in this manner, but the new lining is made to cover all the inside. Fig. 47 represents the method of cutting the lining for one side of the collar. When leather is used, it is necessary, of course, to reverse the pattern in cutting the other half. The lining is made to lap at the throat, as shown at E (Fig. 46), and is fitted in quite close at the top.

With regard to the tools used in re-lining collars, etc., the hand-iron is used for pushing the needles through the collar. It is made with either a straight or bent stem, the latter being preferred by

many on account of its being less liable to slip through the hand. Half-moon needles are made in sizes ranging from 3 in. to 7 in. in length, the thickness increasing proportionately. One each, 4 in. and 5 in. long, will answer all the requirements for ordinary work. Straight collar needles, 4 in., 5 in., and 6 in. being the most useful sizes, are also necessary. Seat-awls will be required for shifting and finally adjusting the stuffing, or "levelling" as it is called.

Collar cloth, 40 in. wide, costs 1s. 4d. to 1s. 9d.

Fig. 47.—Lining of Cab Collar.

per yard; serges, 2s. to 3s.; and collar basils, 2s. to 2s. 6d. per lb. The basils are unstrained, this condition rendering them more pliable to work and softer in wear than those which have been strained. Suitable basils may be bought at any large leather warehouse, but serges and collar cloths can be obtained only of saddlers' ironmongers. Flock for stuffing will also be necessary; it costs from 16s. 6d. to 24s. per cwt.; some houses supply 14 lb. of good drum flock at 2½d. per lb. Collar twine, 9d. per ½-lb. ball, and fine tarred twine, 1s. 2d. per hank, are used for sewing in the linings, but these are not

absolutely necessary; a ball of brown hemp, some shoemakers' wax, and beeswax will answer the same purpose.

For a saddler's black wax melt in a pan over a slow fire till thoroughly amalgamated ½ lb. of pitch and ½ lb. of resin, stirring slowly the while, then add about half a pennyworth of boiled linseed oil, and pour a small quantity of the mixture into a bucket of cold water. Allow to stand for half a minute, then pull the mixture hand over hand; if it sticks well together without cracking or breaking, it is right as to softness, but if it cracks and breaks, put in more oil; if too soft, add more resin or pitch. If the mixture is of the desired consistency, pour it all into the cold water, and pull it hand over hand till it floats on the water; cut a small piece and throw it in to try. Add more or less oil (or tallow will do), according to the weather.

Having procured the necessary tools and material, and made careful observation of any sores and tender places on the horse, the work of relining may be proceeded with, a cab collar (Fig. 46) being dealt with first.

The lining, whether of serge or leather, is cut the same shape, the only difference being that the serge is reversible, whereas the leather is not. Begin sewing in at the top; use a straight collar needle, passing it through from the outside below the forewale and into the crease where the old lining is joined to it. The edge of the new lining is turned inwards, and the needle passed through it and brought out again so that the stitch lies hidden in the folded edge. Push through to the outside again, then return, and repeat until the throat is reached, when the other half must be lapped about ½ in., and the sewing continued until the top is reached again. The splice at the throat should be exactly in the middle, as shown at E.

When the stitching has been completed, the

collar will be ready for stuffing. Loosen the flock well, and lay it evenly all over the body side, using very little at the throat and the top, so that the depth may not suffer. Remove the stuffing from the parts to be eased, and stitch the lining down firmly to the body side; then pad well round the edges of the cavity.

Begin to sew the remaining edge to the collar, using the half-moon needle for the purpose. It will be noticed, by turning up the edge of the afterwale, that it is stitched to the body side about ½ in. from the edge, and that all the stitches are

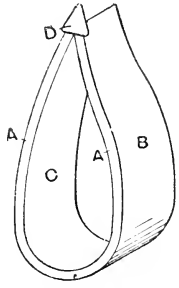

Fig. 48.—Collar.

hidden from the top. The new lining must be sewn in the same manner, if neatness is aimed at. Press the edge under the afterwale, and alternately pass the needle through, pulling each stitch well home when made.

If the collar has been lined with serge, the stuffing may be worked as desired by using the seat-awl, and any unevenness disposed of. Pass the awl through the serge into the lump to be removed and gently work it in the required direction. Passing one hand along the lining will show when evenness has been obtained.

A collar should fit the horse perfectly, or it will

probably produce either galling or choking. One that is too wide, or deeper than it should be, will produce galling; whereas if the collar is too small, choking will result.

When lining a gig collar, it is better to take off the lining and make it like new. But when it is a question of healing sore shoulders, though many put pads near the sores to keep the collar away, the most commendable system is to chamber the collar opposite the sore, which can be done as described in the next two paragraphs.

In the lining opposite the sore part make two cross slits, their lengths varying according to the

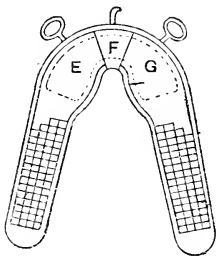

Fig. 49.—Panel Saddle.

extent of the sore. Then damp the leather well, and turn up the four points. With a knife scoop a big hole in the straw underneath, taking it out to a good depth, and making the hollow slant towards the sides; but cut in farther than the leather can be turned up, so that there will be no sharp edge to the hollow to cause another sore.

A small collar needle and a long thread with a little twist will be needed for stitching. Make some stitches from the outside of the collar to draw the leather lining down deep into the hollow; stitch round the edges, and also put several stitches in the centre. Some makers put flock under the

stitches inside the hollow. The collar can also be patched up again when the sores are healed.

Another method of providing for sores, etc., is as follows:—The stitches which connect the lining C (Fig. 48) to the afterwale B are cut, and the wool or other material with which it is padded at the place touching the injured part is taken out. The lining is drawn down to the form of a hollow by putting a stitch or two right through the body of the collar with a needle. Additional wool may be put in above and below the cavity by the use of the stuffing-rod. See that the wool does not form into lumps, but lies evenly all round the cavity. In

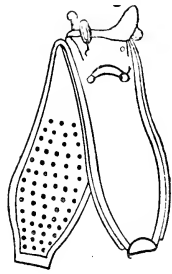

Fig. 50.—"Swelled" Flap Cab Saddle.

sewing the lining to the afterwale, use a needle and collar twine. A shows the forewale and D the cap.

The dotted lines in Fig. 49 show the parts which are likely to cause any injury found on the back or withers of the horse. To remedy this, knock out the nails round the gullet at F, and loosen the panel on the side causing the injury. An opening will be found in the back of the panel; take out the padding from where the lining is stained, and pad round the cavity as in easing the collar, according to the instructions given in the last paragraph. If the injury is caused by the part at F chafing, then

both sides, marked E and G, must be padded more fully.

Re-lining a saddle is a somewhat more difficult job than re-lining a collar. That shown by Fig. 50 is known as a "swelled" flap cab saddle. The panel (Fig. 51) must first of all be removed. It will doubtless be found to be fixed to the flaps with copper wire, which must be cut, the best tool for the purpose being an old hand-knife made into a rough saw by jagging the edge with a chisel. It will pass freely between the flap and panel roll and sever the wires. Remove all pieces of old wire, then cut the quilting stitches on the back of the

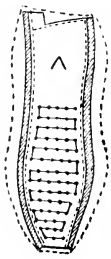

Fig. 51.—Panel of "Swelled" Cab Saddle.

panel. The dotted lines (Fig. 51) show how to cut out the new lining. Fold the serge and lay the panel on it, then cut as indicated.

There are two methods of stitching in the new lining of a saddle:—(1) By entirely removing all the old one, and stitching the new to the facing, as in the case of a new panel; or (2) by cutting the old lining near the stitches made in quilting in the roll, folding the edge of the new lining, and hiding the stitches within the folded edge, as in the case of lining a collar.

The first of the above plans is always adopted in the case of best gig saddles. When the lining has

been stitched in, quilt it all round near the facing, to keep the roll in its place. This done, lay it, lining side down, on the bench and begin to put in the stuffing, using a long flat rule for the purpose ; fill it firmly on each side as far as the quilting reaches. The quilting must next be proceeded with, long stitches being formed on the back of the

Fig. 52.—Straight Awl.

panel, as shown in Fig. 51, and the lining just caught, as shown in Fig. 50. Needles for this work should be 4 in. long.

The proper method is to lay the panel, lining down, on the bench, and quilt it from the back. If the needle is driven straight through, the stitches on the lining will appear uniform. When both sides are quilted, the panel must be sewn across at

the top, as in Fig. 51, and the rest of the stuffing pushed in through the **V**-cut. Fill this part well, and work it out towards the front and back by using the seat-awl; it will then be ready for fixing in again.

No. 22 copper wire will be the best to use. Cut sufficient pieces, 4 in. long, then take a straight, sharp awl (see Fig. 52), re-open the places in the flaps where the old wires were, and put in the new. This done, put the panel in the saddle, fix it by two nails under the crupper loop, and nail it round the gullet with $\frac{3}{4}$-in. cut tacks; then pass the points of the wires through the panel close to the roll, cross them, and twist up tight. Lastly, cut off the ends, but leave $\frac{1}{2}$ in. of twisted wire to be bent down into the channel.

CHAPTER XIII.

WHIPS, HUNTING CROPS, ETC.

A GOOD whip, properly used and cared for, will last for years ; and in this chapter it is proposed first to give the chief points to be observed in maintaining whips in a suitable condition for the work expected of them.

The varieties of driving whips may be summed up under three heads—the bow-top (Fig. 53), drop-thong (Fig. 54), and gig (Fig. 55).

When whips are not in use, they should not be carelessly thrown into a corner or left in the trap, but they should be carefully hung up on a hook, so that the stock and thong may retain a perfect shape, which is not otherwise possible.

The mounts should never be cleaned without first rolling a piece of stiffish paper round the stock to prevent it becoming soiled by the material used in cleaning. Good whiting, free from grit, is unequalled as a polish ; but if the mounts have become much tarnished, Monkey Brand soap or one of the many metal polishes should be applied with a piece of flannel, the polishing being done with a piece of soft chamois leather.

The handle should be sponged occasionally with a damp sponge, and, should the varnish have become dull, give it a very thin coat of either white or brown hard spirit varnish, which will revive the lustre. Stick stocks, such as holly, yew, malacca, thorn, lance, and other woods, may be dried with a soft cloth after sponging.

It is a good plan, when hanging up a whip, to make a noose of string or other material, which should be first slipped round the stock and then

passed over the hook or nail. In the case of a whip with a quilled or bow top, see that the noose escapes the part which naturally bends over; it should be placed on a gig whip where the thong is bound on to the stock. This will keep the stiffened part more erect, and prevent the whalebone inside becoming broken or otherwise getting out of shape.

Solid brass, nickel, or silver mounts will, of course, wear all through alike, and those mounts which are hard plated will stand a lot of polishing before the foundation metal shows through; but mounts which are lightly electro-plated on very common metal quickly lose all signs of the silver. These should be gently rubbed with a soft chamois, and not allowed to tarnish, which always means either more violent rubbing or the application of some substance to remove it.

The thongs and keepers should receive an occasional dressing of tallow, which not only preserves them but keeps them pliable. This must be well rubbed into the parts with the hands to ensure it penetrating into the leather.

The commonest injuries which happen to whips are: A broken keeper either on the thong or the stock in the case of the dealer or drop-thong class (Fig. 54); the stock broken, in or near the bow, in the class shown in Fig. 53; a broken point to the thong, the quills broken where the thong joins the handle, or the handle itself broken, in the case of gig whips (Fig. 55).

To repair a broken chape or keeper, first of all remove the old one, if it is the keeper on the stock which is broken; if it is that on the thong, cut the broken pieces off nearly level with the plaited part. Take a piece of white horse-hide, of good quality and pliable, and skive this down at each end, leaving the full substance slightly beyond where the binding thread will reach when it is folded end to end and placed in position.

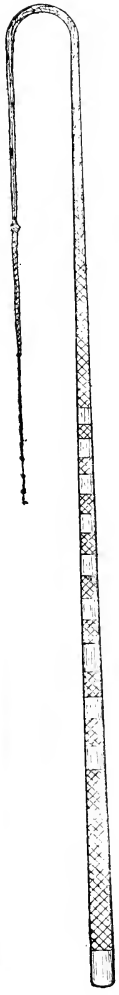

Fig. 53.

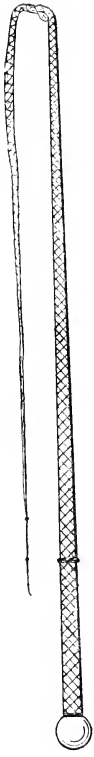

Fig. 54.

Fig. 55.

Fig. 53.—Bow-top, or Carter's Whip. Fig. 54.—Drop-thong, or Dealer's Whip. Fig. 55.—Gig or Coaching Whip.

This skived part must be well waxed by laying it on a board or bench, and rubbing a ball of shoemakers' wax down it several times so that a thin coat of wax covers it. Treat the end, to which it is to be fixed, in a similar manner, and, to ensure perfect adhesion between the parts, warm them gently, place the keeper in position, and press them well together with the fingers.

If there should be any surplus of leather where the edges of the keeper meet, trim it off with a sharp knife, and see whether there are any uneven places; if so, put them right before proceeding to bind it on. There should be a uniformly even, but very slight, taper from the top of the binding to the bottom. The full thickness of the leather at the top of the stock over the reduced part lower down will naturally produce this.

If the stock should be a brown one, either gut or thread, use a beeswaxed thread made of white hemp; if black, then use fine brown hemp and black wax. Make a long thread by passing the strand of hemp, held in the left hand, over a hook, bringing it down to the same hand again, repeating the operation until there are three strands on each side of the hook. See that the three strands on one side are quite separate from the others; hold these firmly between the thumb and forefinger of the left hand, about eight or nine inches from the end, and with the right hand rub this part down the thigh of the right leg, releasing the grip of the left hand during each stroke. When this part is well twisted, repeat with the other half of the thread; draw the wax sharply down the twisted strands and along the part round the hook. When sufficiently waxed, tie a slip loop at one end and pass this over the hook.

Begin binding on the keeper by laying about an inch of the other end on it lengthwise, so that the first few turns will secure it. By standing away

from the hook the full length of the thread, and holding the stock in a horizontal position, the thread can be wound tightly and evenly on.

The method of binding on a keeper for splicing a stock is fully explained by Figs. 56, 57, and 58. The method of starting the binding is shown in Fig. 56, and Fig. 57 shows how to finish it off securely.

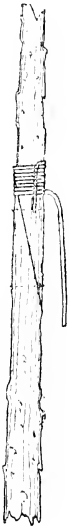

Fig. 56.

Fig. 57.

Fig. 58.

Figs. 56 to 58.—Methods of Splicing Broken Stock of Whip Stock.

Of course, the start and finish of the thread should lie perfectly hidden beneath the coils, but in order to illustrate the method clearly they are shown in the diagrams. Let each coil lie perfectly close to the preceding one, and in finishing off, as in Fig. 57, drop down sufficient slack, and wind the end of the thread back towards that already wound, passing it under the last turn. Then, by con-

tinuing the original, the other unwinds, and a portion of the thread lies under the last few coils. Pull the slack well home and cut it off.

Lay the bound part on a hard, level board, and with another piece of hard wood roll it backwards and forwards, using plenty of pressure; this will give it a nice smooth finish. For better appearance still, a little spirit varnish may be put on.

Now proceed to put thong and stock together. The method of doing this is fully explained by Fig. 59. Pass the loop at the end of the thong over the keeper on the stock, then take the point of the former and pass it through the latter and draw it well home; the two parts will then be as shown in Fig. 51.

A fresh piece of whipcord is generally put on a thong in a very bungling fashion, and not always securely. The proper way to do this is shown in Figs. 60 and 61. Unbraid the end of the thong and separate it as in Fig. 60. Lay the cord between the four ends—two on each side of it—with sufficient left for making the loop. Fold over the ends of the thong, and pass the end of the cord round them and under the cord as in Fig. 61. Draw down tightly by the knotted end of lash, and trim off the surplus not too closely; this will be found not only a neat but a secure way.

The knots in the points of lashes prevent the lash ravelling away quickly, and the neatest method of forming them is to separate one strand of the cord from the other two, and tie this over at intervals, twisting it into its place again in the spaces between the knots.

Whips of the class shown in Fig. 53 generally suffer at the part forming the bow, and to repair these place a piece of thin whalebone about 1½ in. long on each side of the whip, and bind these to it. Twisted points, made of raw hide dressed in oil, are always put on this class of whip, and the whip-

cord point fixed to these. Fig. 62 shows the way to put them on.

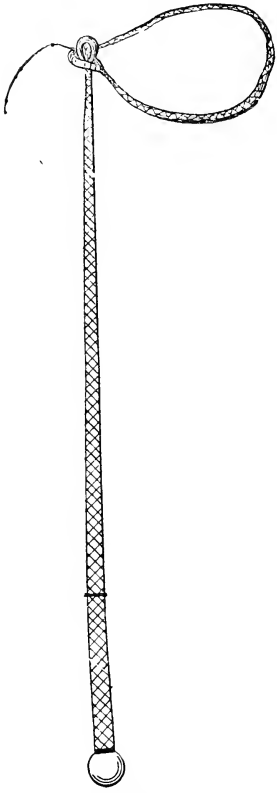

Fig. 59.—Method of Joining Thong and Stock of Drop-thong Whip.

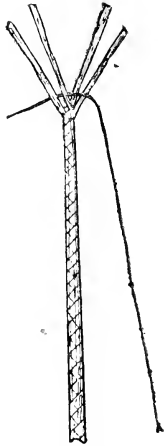

Fig. 60.—Method of Fixing Silk or Cord Lash to End of Whip Thong.

In the case of a gig whip (Fig. 55) having a broken thong requiring a new point, it may be said that such points are made in various lengths, and

differ in thickness, so that it will be necessary to choose one of suitable substance and length to match the old thong. The number of strands constituting the plait carries from four to eight; and the strength is generally in proportion to the number of strands, but the process of putting on is the same with all.

If the old thong is not already unplaited, proceed first to do this for about 1½ in., and see that

Fig. 61.—Method of Fixing Silk or Cord Lash to End of Whip Thong.

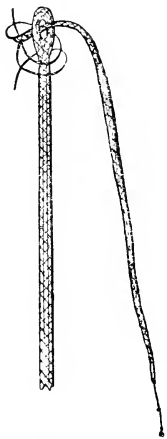

Fig. 62.—Method of Fixing Twisted Gut or Hide Point to Carter's Whip.

the new point is opened about the same length. Figs. 63, 64, and 65, which show a four-plait in each case, give the method of fixing them together. The separated ends are put between each other, as in Fig. 63, and the ends are brought down and held close to the part they should lie on. Take the strand first which is farthest open, and pass it over the other three, as in Fig. 64. With a pair of flat-mouthed pliers pull this as tight as possible. Take

one of the others which comes best into position, and, when all have been turned through and pulled well home, treat those on the other part in the same manner.

The joint will now appear as in Fig. 65, and it will be impossible to pull it asunder, because the greater the tension the tighter will be the grip on

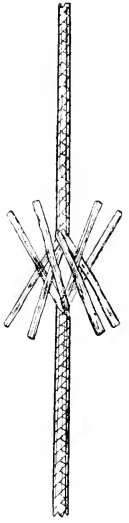

Fig. 63.

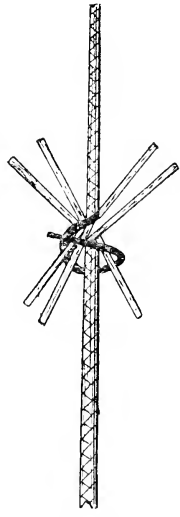

Fig. 64.

Figs. 63 and 64.—Method of Joining New Plaited Point to Old Whip Thong.

the strands, separately and collectively. The projecting ends must be trimmed off, but not quite close to the thong now formed; lay the joint on a level board and roll it as described previously for putting a keeper on a drop-thong whip.

Carelessness in leaving the whip in the socket, whilst running the trap into the coach-house, is

generally the cause of broken quills. For repairing, get a few good goose-quills and slit them with a knife into halves. Take off the thread round the old thong, and pass one or two half quills down inside the old ones. Some people use steel pens instead of quills, but generally they are too short to make a satisfactory job. Having fixed the new support, bind up again, following the plan adopted

Fig. 65.—Method of Joining New Plaited Point to Old Whip Thong.

when the thong was new, and which is easily found out by carefully noting the way in which the old thread comes off. Use good black sewing thread for these repairs, and apply a little spirit varnish as a dressing to protect and brighten it.

Another injury to this class of whips is a broken stock, which usually occurs towards the top and at one of the knots. First trim off with a knife any knots in close proximity to the breakage, and before paring down for the splice place the broken parts

together and endeavour to ascertain the natural fall of the whip, or the way when it is spliced which will give to it the best appearance.

Reduce the wood so that it can be joined as shown in Fig. 56, using for this purpose, besides the knife, a moderately fine wood rasp, which should also be used on the part to be covered by the thread. Use good glue in uniting the parts together, and when firmly set bind with a thread of suitable size and colour. The method of binding has already been explained in the instructions for fixing on a new keeper to a drop-thong whip.

The joint may be given greater strength by putting a pin through each end of it, as indicated by the dotted lines in Fig. 56; this prevents the parts drawing asunder. Make the holes with an Archimedean or other small drill.

The mounts at the bottom of a whip handle sometimes get loose or come off. These can be refixed by scraping all the old resin out of the mount and cleaning off that clinging to the wood, and then partly filling the mount with crushed fresh resin, gently warming it until it becomes liquid, pressing it on to the handle again, and allowing it to cool.

Whip lashes are generally plaited with four tapering leather ends, round a tapering "heart." The plaiting can be done with any even number of ends, and is termed "cross-pointing." If, however, four ends only are worked, and no "heart," the result is the same as a sennit made with four ends, explained in the next paragraph. This method is the quickest where two can work together, but for single-handed work another method will be found easier.

For plaiting square sennit having four ends, take four ends of gaskin, and tie them to a hook in a post. Take two ends, and cross them beneath the hook. Hold these two ends out, then cross the

two others beneath them. Thus proceed to cross the two ends alternately, as indicated in Fig. 66, where A and B are shown in the act of being crossed between C and D. Pull each tight, and hammer square when complete.

Eight-stranded square sennit is shown partly completed in Fig. 67, which explains the position of the 8 ends during the work. Begin by crossing the 2 centre strands—say right over left—then take the outside right strand, pass it round at the back of the rest and up between the strands on the left,

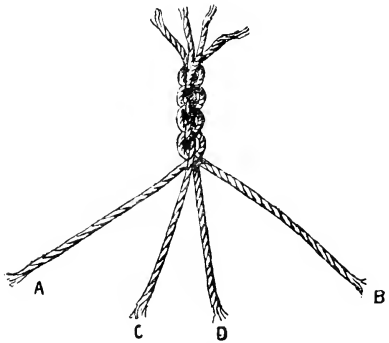

Fig. 66.—Plaiting Four-stranded Square Sennit.

bringing it over in front to its own side again ; then take the outer strand on the left side, and bring it up between those on the right, and back to its own side again. In the figure, strand 4 was taken from above 1 and passed up between 6 and 7, and brought back over 5 to its own side as shown. Strand 8 will be next taken and passed up between 2 and 3, then brought back over 4 to X. This done, each opposite face of the sennit will appear the same. In working, remember to keep the same face always uppermost ; the end A must, of course, be secured to something at a convenient height.

The following methods of cross-pointing are recommended for making whip lashes. The methods of plaiting square sennit, shown by Figs. 66 and 67, may be useful on occasion, but the whip maker is more concerned with plaits that have cores or hearts. However, Fig. 68 shows a coreless plait popular in the trade.

In Fig. 68, the end C was taken from O, passed

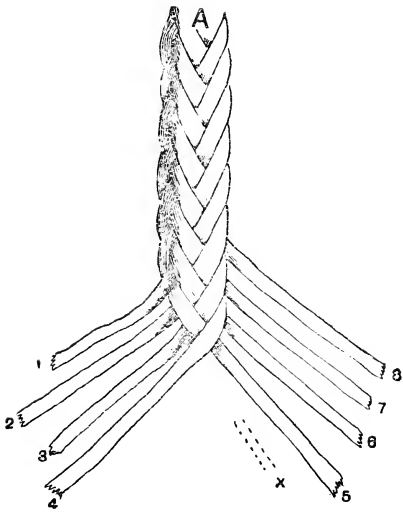

Fig. 67.—Plaiting Eight-stranded Square Sennit.

back to the left, then forward between A and B, and crossed over to its present position, C, on the right. The end A will next be passed back to the right, forward between C and D, and crossed over to the left, as shown by the dotted line, X.

In Fig. 69 the plait is precisely the same as in Fig. 68, only round a heart. The end C was taken from O, passed round to the left at the back of the heart, and brought forward between A and B, then

crossed over in front of the heart to its present position. A next goes round the back of the heart, and forward between C and D, and across in front of the heart, to X. When the tapered end of the heart is reached the process will be as explained before (Fig. 68).

When about 2 in. from the end of the lash insert a piece of whip-cord, as W P (Fig. 68), pull through one-third of its length, then taper the leather ends, A and D, off to about 1 in. in length; proceed as before, but whenever A or D are worked, carry its

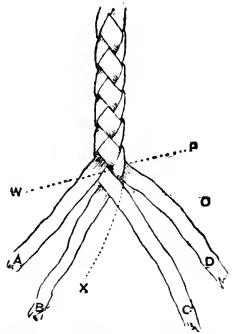

Fig. 63.—Plaiting Whip Lash without Heart.

accompanying whip-cord end with it till A and D run out, then taper B and C off in the same way, and work with four ends as before, two being leather and two whip-cord; when B and C run out "lay up" the whip-cord tight, and splice the shorter end into the longer.

There are few things more difficult to find out for one's self, perhaps, than how to work buttons, collars, and ferrules on whips, hunting crops, and walking-sticks. Undoing the work is of little avail except to those who have some knowledge of it; this plan may then be profitably employed in dis-

covering the method of working any new pattern which one may come across.

The material used for working buttons and ferrules on whips is generally gut, similar to violin strings but not of such good quality. For ferrules on walking-sticks silver wire is used. This varies in price according to the gauge. Any size up to No. 22 B.W.G. is 3s. 1d. per oz.; from No. 23 to 25 the price is 3s. 3d.; and from No. 26 to 30, 3s. 6d

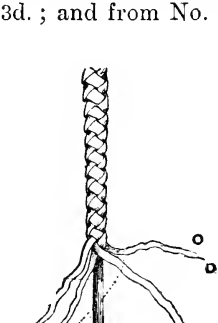

Fig. 69.—Plaiting Whip Lash with Heart.

per oz. As a guide, it may be mentioned that about 27 ft. of No. 22 B.W.G. weighs 1 oz.

As the groundwork is the same, whatever the pattern may be, it will be seen that when the manner of doing this is once mastered any pattern, however elaborate, can be worked by carefully observing the course of each strand and making a complete record of the manner in which the strand, in course of manipulation, passes through its counterpart in forming the ferrule. By adopting this method a complete guide for future reference will be obtained which, if closely followed, will furnish

the means for carrying out the work in a satisfactory manner.

In taking one of these ferrules to pieces, a commencement should be made at the finished end; therefore, in making a record of each course taken by the strand which has been interwoven to form a ferrule or collar, begin at the bottom of a sheet of paper and work upwards; there is then a straightforward guide in attempting to work a similar pattern. Be careful to mark down every change made when passing from one stage to another; the slightest error will cause endless trouble and prevent a satisfactory completion. If, being satisfied

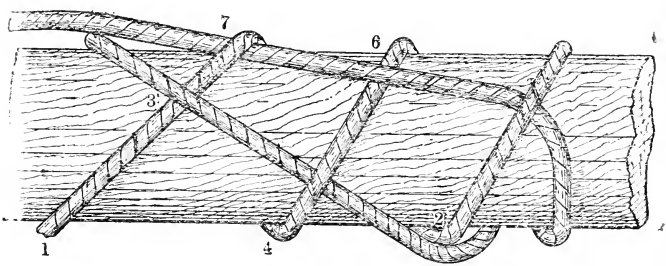

Fig. 70.—Beginning Groundwork or Mesh.

that the guide is correct, it is found that the pattern will not come right, it is certain that a mistake has been made in reworking it; at once try to find out where the mistake exists, and rectify it. The work must be undone to this point, the mistake remedied, and another attempt made.

There is no work in which the advice to "make haste slowly" could be more usefully given than to the tyro at this work. The greater his diligence, the sooner will his aim be accomplished; but haste and carelessness will inevitably lead to failure.

By referring to Fig. 70, the first portion of the groundwork or mesh will be seen. Begin at 1, and

bring the cord round at 2; it is then carried round again, and brought under the thumb at 3. Pass it round, and bring it midway at 4, then over the top and up at 5. Here it is passed under the second

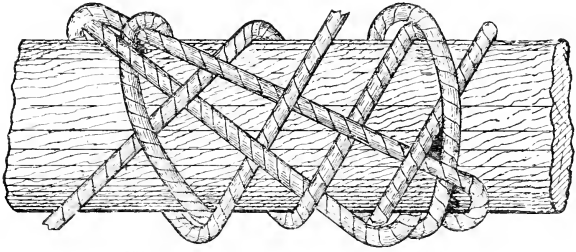

Fig. 71.—Second Course of Mesh.

turn which was made, carried over the fourth at 6, under the first at 7, and over the third at 8. It is then brought round and passed to the left of 4 and over to the left of 6. Pass it under the next cross strand, and bring it up outside of 5; carry it over

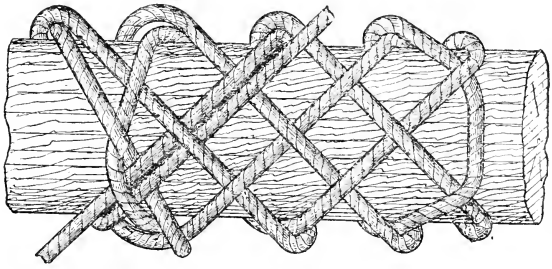

Fig. 72.—Mesh Completed.

the first strand back, then under one, over two, under one, over one; now turn again when the stage shown in Fig. 71 is reached.

The cord in its course is here seen to pass over the first, then under one, over one. In continuing,

it passes over the next two, then over one, under one. Turn again, and pass it under one and over the next alternately, when the mesh will be completed. This is shown in Fig. 72.

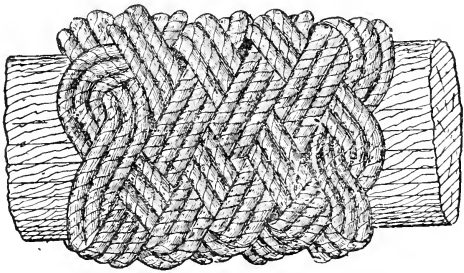

Fig. 73.—Ferrule Complete.

The second course is then begun. There is no difficulty now in completing the ferrule, as the cord or wire is simply passed under and over to correspond with the mesh. Always keep to the right of the start—to pass beyond this throws out the pattern.

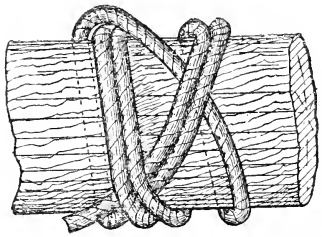

Fig. 74.—Mesh on Single Turk's Head.

The finished ferrule shown in Fig. 73 has three courses. There is no limit to the number which can be made, provided the mesh is slack enough to allow a greater number being passed through it.

If the ferrule is found to be too loose, an additional course will tighten it; but this might not always prove satisfactory, especially if a given number of strands in each direction is desired.

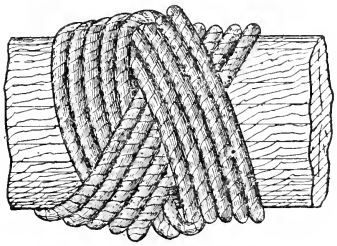

Fig. 75.—Single Turk's Head Completed.

The length of ferrule must also be considered at the commencement, and this is decided by the number of turns in each direction of the mesh. There is no limit whatever to its length.

Fig. 74 shows the groundwork of a very simple

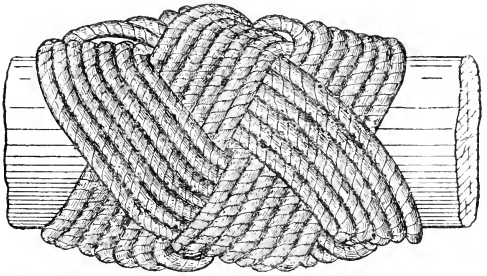

Fig. 76.—Raised Turk's Head.

collar used on dog-whips and some hunting crops. This is commonly called a "Turk's head." It generally has several courses or strands. Fig. 75 shows five. Fig. 76 is a "raised Turk's head." This is formed by working a small one on the stick first,

and then working another over it, carrying it beyond each end of the first button, so that the raised part is in the centre.

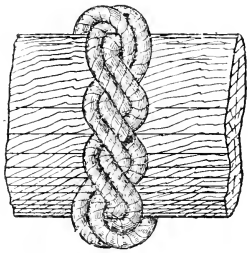

Fig. 77.—Small Button for Hunting Crop.

Small buttons for finishing the ends when binding on the keeps of hunting crops are shown in Figs. 77 and 78. The method of working these is given in Fig. 79. The cord is passed once round the stock, and in its next course threaded through it to form the twist. It is then kept to the right of

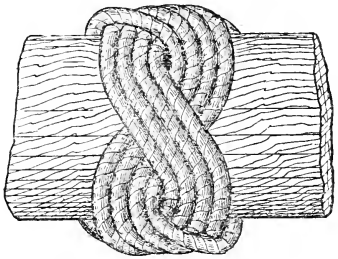

Fig. 78.—Four-strand Button for Hunting Crop.

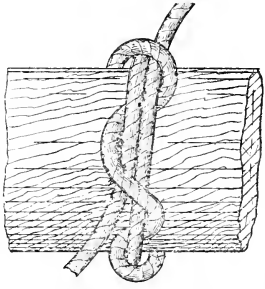

Fig. 79.—Beginning Small Button.

the start and made to follow the direction of this as many times as desired. Fig. 77 shows a button formed with two courses and Fig. 78 one in which there are four courses.

CHAPTER XIV.

SET OF GIG HARNESS.

THE making of gig harness is not strictly the work of a saddler, though, of course, the country tradesman has often to do both harness and saddle making. The two branches of the trade must be distinguished between, however, and whilst this handbook is devoted chiefly to saddlery there is a companion volume dealing with nothing but harness making. Considerations of space forbade the inclusion in that volume of a chapter on mak-

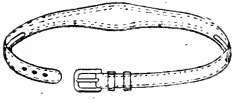

Fig. 80.—Nose-band.

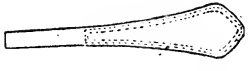

Fig. 81.—Drop, or Breast plate Ornament.

ing gig harness, and as the work is of a superior kind, and is likely to fall to the lot of the majority of saddle makers in country shops, there need be no apology for inserting such a chapter here.

The bridle of gig harness is made as for a van harness (see the companion volume), but the work is finer and the material better; the nose-band is often cut in some fancy wavy pattern, and the work is much finer.

Sometimes the nose-band (Fig. 80) is rounded by placing a piece of leather or card underneath; when it is stuffed only the outer row is, as a rule, stitched through both top and lining, the first ornamental rows or patterns being stitched through one thickness only at the top part. The winkers are also made smaller and stitched finer with two inner rows close together.

A drop (Fig. 81) is often made with some fancy ornament to run down the face from the buckle or head-piece; it must be 1 ft. 1 in. long, with a fancy pattern cut at the hanging end where the ornament is fastened. The drop may be made of patent leather, lined and stitched all round with two fine rows of black linen thread. Finish it neatly and make a hole in the point for fastening the buckle on the head under the winker strap. If preferred, a loop for it can be put on the forehead band, or a runner may be used to keep it and the winker strap together at the top below the buckle. The drop and winker strap can also be made in one by leaving an opening in the drop 5 in. from the point for the winker strap to pass; the last is made round like a bearing rein with a small cord inside.

The winker strap also is sometimes lined and stitched fine with two rows, or it may be ornamented with stitching without lining, or again with rounded slits. In making the best harness, a piece is put along the centre of the head-piece to form a loop for the winker strap point, and runs down on each side as far as the slit, being raised in the centre as much as possible, and stitched very fine; all this is for the sake of strength and ornament.

With bradoon fittings, however, this piece is turned outwards at each end, and a chape is made to go over and fasten the eyelet for the hook of the bradoon swivel chain (Fig. 82); or a small brass dee is used to fasten the small straps by which the swivels hang, because with bradoon fittings no swivels are put to the throatlash. These fittings are made by stitching two straps, about 6 in. long, underneath the head-piece right at the top of the slit; make very fine stitches on the head-piece, and let the straps hang down inside the cheek. Run the bearing rein through the swivels and down through the bit rings to buckle in these straps at

each side. Thus a bearing rein with bradoon does not need billets, but at the round part must be made about 1 ft. 1 in. longer than an ordinary bearing rein.

The winkers are frequently made with ornaments; for adjusting them, holes must be cut through the winker plate and the leather with a fine hard steel punch. The legs of the ornament must be put into these holes and then cut short as close to the leather as possible underneath; then flatten the points well down. These directions and what is said in "Harness Making" on van harness will suffice for the making of the bridle

The instructions regarding collar making will apply, in general, to all, but gig collars must

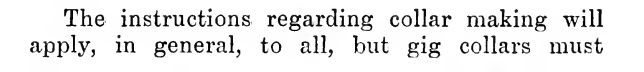

Fig. 82.—Bradoon Chain.

always be made of patent leather. The forewale is always lined with calico to prevent the leather cracking, and must be turned down for about $1\frac{3}{4}$ in., or altogether for $3\frac{1}{2}$ in. For stuffing, employ a fine collar iron. It is also well to have somewhat shorter wisps than for cart or van collars; see carefully that they join properly.

Cut the lining out of the best basil leather and put it in place while stitching the forewale, making the collar lighter and of better shape than the heavy types. Let the lining and flock be made quite smooth, free from lumps or wrinkles. The patent leather side-piece is bound as described, but a paper pattern can be cut in one piece all round so that no housing will be needed; it is joined at the bottom under the throat, and is called "London top." If in two parts, join it at

top and bottom, like a van collar, the top piece and housing being made likewise, but with finer stitches. The width of the collar at the widest part is 8 in. to 10 in., as required by the neck, the length being fixed on the same principle. Black basil may be employed for lining, or instead, black the lining when finished with soda and iron dye, afterwards rubbing it with a ball of tallow and the palm of the hand to "kill" the dye.

For the gig saddle (Fig. 83) obtain a tree (Fig. 84) 4 in. to 4½ in. broad at the top (they are often smaller), put on it a thin sheet-iron seat plate, shaped like a saddle seat, nail it against the cantle at the back with two or three tacks, and at the front or gullet with a short piece of leather underneath to raise it a little. Then cut a piece of thin basil a little larger than the plate. Shave all the edges thin, damp and paste it over the seat, and turn it down round the edges at the sides and over the cantle as well as in front; this prevents the leather above being rotted by the rust from the iron seat.

Now cut a piece of thin pliable patent leather slightly larger than the seat and sufficiently long in front to be nailed underneath, and about ½ in. above the cantle. Having damped it, tack it down tight to the tree and leave it there to dry.

The skirts (Fig. 85) are now cut; these are the other parts of a gig saddle which cover the portion through which the backband passes. Make them of stiff patent leather to reach about ⅜ in. over the tree at each side and about 1 in. below the bottom of the tree where the backband runs, but not covering the points. These three sides must be cut straight, and the top level with the edge of the seat plate in front and of the same shape as it is in the narrow part, running downwards to terminate in a rising point and rounding upwards just by the root of the cantle. Cut both skirts exactly

alike, quite square with the tree when in place on the seat.

Run the race compass along the edges and bottom of the skirts, about $\frac{1}{8}$ in. from the edge, and then make another groove $\frac{1}{4}$ in. inside that all round the four sides and at the top, but do not let the top groove run farther than the points of the side grooves; all will then meet at a terminal point. A piece of plain leather must now be cut to reach about half-way up the skirt from the

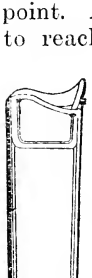

Fig. 83.

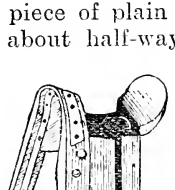

Fig. 84

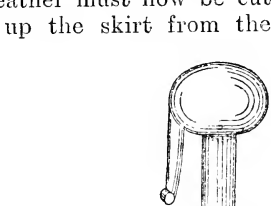

Fig. 86.

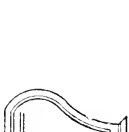

Fig. 85.

Fig. 83.—Gig Saddle. Fig. 84.—Gig Saddle Tree.
Fig. 85.—Gig Saddle Skirt. Fig. 86.—Stand Hook.

bottom, the upper part being shaved thin, with grooves pricked all round, and the inner groove stitched all along through the top and under-piece. Then stitch the bottom line across and over the corner at each end, twelve per inch, and trim and polish the edges. Then skive a little along the top edge and mark out the seat along the top edge of the skirt from end to end, having a piece of patent thin welt about 1 in. longer at each end than the skirt to run along the edge at the top. Run a stitch over the welt and skirt along the top, after doubling the welt by turning it down along the centre. Along the mark cut the seat,

and mark this at the place where the skirt is first to be joined and at the other end; thus, after stitching it will be in its proper position.

The seat and skirt may now be back-stitched together, the welt being kept in the centre of the joint; use a pointed needle and linen thread and a thimble. Work both sides in the same way and rub down the joint underneath. Cut a piece of patent leather for the back of the cantle ½ in. longer all round, and make two punch holes and a slit for it to pass over the crupper loop at the bottom, one part of it running through the centre of the loop inside. Nail that piece down under the back of the tree and drive two nails into it at the centre of the crupper loop. Cut it at the sides to meet the seat at the edge of the cantle, and then, after damping the seat and placing it in position, tack the seat at the back-piece together all round the cantle close to the wood, using a pointed needle and thread.

Cut round the stitches with the edge tool, leaving enough margin to bind the edges, and then cut out a thin piece of patent leather binding sufficiently long to go round and with 1 in. extra at each end. Lay it on tightly over the edge and stitch fine with double thread black linen, beginning work right at the bottom at the root of the cantle and finishing on the other side at the bottom.

Nail the front part of the seat neatly with ⅜-in. tacks just under the edge of the tree and cut two holes for terret sockets with the brace, one on each side of the tree in front, just by the side of the groove. Raise the skirt out of the way while working, and make another hole opposite those just made in the skirt. Having inserted the sockets from below, nail them securely and then cut a hole through the seat opposite the hole in the tree through which the stand hook (Fig. 86)

is put. It is taken for granted that the skirt is made perfectly square, but the corners may be rounded; whatever the shape, the method of work is always the same.

The saddle flaps (Fig. 87) must now be made; they should be about 1 ft. 8 in. long in front, and 1 ft. 9½ in. at back, and for a 4-in. tree must be 4¾ in. wide at the top. Cut them straight down to the bottom, gradually narrowing until 2 in. from the base, where they taper in a rounded form to

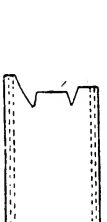

Fig. 87.

Fig. 87.—Gig Flap Showing Cuts.

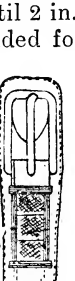

Fig. 88.

Fig. 88.—Hame Tug with Safe.

about 1¾ in. Cut a groove along the sides and bottom a little farther than ⅛ in. from the edge, and another ¼ in. inside it; do not cut the last quite to the bottom, however, but with the race make a half circle from corner to corner at the bottom and join the middle grooves to the edge of this. Now cut out the lining from uncurried brown belly, paste the lining on the flaps and let them dry. Prick them, double-stitch twelve per inch, all but the half circle and the cross line at the bottom.

The edges can now be finished and well polished; make them as level as possible, but do not

round them as much as the edge of a trace or backband, merely edging the patent leather top. From this trim them level inwards below so that the flaps lie close to the panel facing. The longer side point must reach close to the crupper loop underneath the tree; mark this therefore. The other side at the front must be above the tree, but if it is too high the flap will be drawn too much forwards, and if too low it will start backwards; make sure that it is quite square with the tree.

A piece must be cut out at the top to fit the flap and to keep it in position as regards the point at each side. Opposite the groove in the tree mark a line across the flap, and from the back end of the line to within an inch of the outer top back edge make a slanting cut. Now from the front end of the mark run a slanting cut upwards to within an inch of the front edge; the middle part must be cut square to the same width as the groove, and 1½ in. long from the line. Shave the end of the piece thin and also the inner sides of the slanting cuts underneath.

The saddle flaps can now be put in their places, hind point below and front point above the tree, the middle cut entering the groove. Nail the point behind close to the loop, then the front under the skirt and the middle cut in the groove. Make sure that the flap points are at equal distances from the edge of the tree, and perfectly square to each other and the tree.

There now remains a space, between the ends of the flaps at the gullet in front, which must be filled, and for this purpose a piece of patent leather is cut to the required length. If necessary, line it so as to obtain the same thickness as the flaps, and stitch the outer line in the same way as the flaps along the outside. Thin the inner side all along and make a punch hole a little below the junction point of the skirt and the seat on each

side. Put it in place, by measure central between the two holes which cut at about half the width of the leather. Shave it thin from that line inwards, letting it approach close enough to the tree in front to be in a straight line with the flaps. Make a slit running from the two punch holes towards the inside, and nail the centre part under the tree all round the gullet. Raise each side of the lower part above the tree—from the punch hole downwards—under the skirt to meet the points of the flaps. Bring them together quite tight and nail them to the tree; if the inner side happens to cover the terret hole it must be cut.

A stitch is now made with copper wire from the point of the flap to the point of the gullet piece underneath, and is tightly twisted to draw the edges together. Tack the front of the skirts square down on the flaps and stitch the outer line left from top to bottom on each side through both skirts and flaps. The flap should project beyond the side of the skirt for about $\frac{3}{8}$ in. Now place a piece of thick leather under the edge of the skirt behind, to make it level with the rest of the face. As the flaps are nailed under the tree they fall below the surface during the operation of stitching. Add enough to raise them and stitch the skirts down again from behind the crupper loop to the lower corner of the skirt; trim and black this piece afterwards by the edge of the skirt. (Fig. 88 shows the hame tug).

The flaps may be cut like the skirts of another pattern, swelling them at both sides and rounding them at the bottom; in this case the skirts must be rounded to match. Nail a piece of thin leather on the side of the crupper loop, twist it round from end to end, and drive a nail in the other side, and then two tough nails through the tree at both the top front corners of the flaps, and one on each side through the point of the cantle, binding at

the root of the cantle behind. Clinch the front nails under the tree and cut the hind ones slanting about half length before driving them into the tree.

To make the girth, work as explained in the companion handbook, but let the stitches be finer; the lay may have to be put all along the girth, this being narrowed from the last loop to the top, about half the width of the front part and the edges being shaved to bring the lay close to the body. The strap may also be shaved, lined, and edged, the top part being rounded; fill it along the middle and put on the wide piece at the top to fasten to the flap of patent leather. Then stitch it round the edges, narrowing it at the bottom to the same width as the strap, the under-part of this being placed under and the other above it for stitching; finish the girth, strap, and loops, neatly. After placing them between the flap and the lining, stitch along the half circle with strong thread.

The panel should be made exactly like the other, but with a paper facing; then stitch it finer with patent facing cover and quilt it closer and finer than for the van panel. To adjust it, nail it round the gullet and at the crupper loop and stitch it with wire.

The traces (Fig. 89) must be cut 5 ft. 9 in. to 6 ft. long by 1½ in. wide, the top part at one end being rounded and the corners only at the other end. As ornament outside the stitches, with the hot screw crease make a row of creasing near the edge, then make another row of creasing inside that, and a third row a little more than ⅛ in. inside. Cross the inner rows neatly about 5 in. from the square end and 1 ft. 4 in. from the other or holed end. Prick the two inner rows, eight to thirteen per inch, according to the quality of harness, but be sure to reverse the two outward

pieces, placing the stronger against the weaker end. Line them level all along, adding an extra piece about 6 in. long, with the inner end shaved at the square end for fastening the trace to the trap; tack or paste them down and stitch along the four inner rows.

Now dip the trace in water just for a minute and level the stitches by rubbing them on the underside with the handle of the hammer; an old flat iron without a handle is very good for this work.

The trace is now placed in the clamp, which must be held between the knees, and the edges are trimmed round with the spokeshave down to the line outside the stitches and to the same depth on the other side. Some harness makers draw the spoke towards them, others push it outwards, but

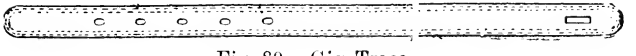

Fig. 89.—Gig Trace.

this is a mere matter of choice. Scrape and smooth with glasspaper, black, and polish well as directed. Cut two holes in the square end, one 1 in. from the end and the other $1\frac{1}{4}$ in. farther in; slit the piece between them by making two cuts, one on each side of the holes, round the edges a little, and black the opening inside and finish.

At the other end four holes must now be punched for the buckles, the first 4 in. from the point, and the others $2\frac{1}{4}$ in. from each other. Cut a little in front of each hole out of the leather underneath, either with punch or hand knife; if this were not done, the point of the tongue, which goes slanting into the hole, might tear the material. Holes should always be punched big enough, and are much better too large than too small. Both traces must of course be made alike.

The hame tug (Fig. 88) fastens the trace to the hames, and is to be made as follows:—For a 1½-in. buckle, the tug should be cut 1 ft. 4 in. by 1¾ in., with a piece for the centre 10½ in. long. Turn down the tug pieces in the centre, making both ends of the same length, and turn down the other piece level to form a chape for the buckle as far as it will reach at the short turning. Now make a punch hole about ¾ in. from the bend through both lining and cover to form a chape for the buckle. Open the punch-hole to the front by making a cut on each side, and shave a little inside the hole in the lining so that the buckle can go close to the bend.

Next slightly round the corners of the top part of the outer long piece, and as the tug is 8 in. long when doubled, the loop to be put on measuring 4 in., make a mark 4¾ in. from the bend at each side, the middle piece being in its place. Now through the three leathers run an awl down each side at the marks, so that there will be a mark on both sides above and below.

Open out the tug and cut ⅛ in. from both sides, mark to mark; when the tug is bent, see that the cuts on each side are square with each other and the opposite cuts. From the mark in the lining now cut ⅛ in. on each side as far as the point and shave this thin. The fore part of the tug will now be of the same width as the buckle, and the other part ¼ in. wider; thus the hind part will have a full neat appearance and the clip be covered when put in. Crease a line near the edge all round the wide part as was done for the traces, and a second line not far from it; then put a third line ¼ in. inside that round the ends as well, being careful to keep the shape in the second line of the turning in the corners.

Prick the two inner lines the same as the trace and shave a little on the edges of the wide parts

on each side both above and below. Stitch all the inner line through the single leather and about ¾ in. in the outer line of stitching at the centre of the point, so as to produce the appearance of stitching all round when the leather is put above the clips. Now make a groove exactly ¼ in. from the edge on the lower side of the narrow part, from the beginning of the cut to both sides of the buckle, for stitching the loop. Let the last be 4 in. long, and wide enough for the trace to enter and meet in the centre.

Use strong double-waxed thread for the loop, blind-stitching it on the last side, and make two strong cross stitches on each side of the buckle. Make this part neat in appearance and crease the loop, checking it to match the winker and shaft tugs.

With the prongs fix the clip in the draft of the hames and push it inside with one prong on each side of the middle piece. Mark the last at the place where the holes are to be cut for the rivets. Remove it and punch the holes, then put it back again until all the holes are opposite. Place the clip in the vice as far as its neck, tighten it down close to the leather, and rivet it; then cut the rivets to length in the vice with a cold chisel. Rivet them down well as smoothly as possible on the top side.

The upper and lower part of the tug leather must now be turned down over the clip, then tacked at each side and neatly stitched. Join the stitches on at each side, with the few cross stitches made over the clip at the end. Then having neatly finished the edges, run a single hot crease along the outer line of the crease made outside the stitches; repeat this operation with the outer line on the traces, making both tugs the same.

A safe is often put under the hame tug, in which case the top layer of the tug need not be

cut to go all along both sides, but may reach about 3 in. over the buckle underneath, and exactly the same on the upper side as if there were no safe. The lining also must be the same, right over the buckle and for attaching to the clip. The inner row of the wide part must be stitched like the other, with the cross stitches at the point; the buckle can now be placed in position and the chape turned down as though for stitching.

Place the buckle end of the tug on the leather intended for the safe, allowing it to pass a little more than $\frac{1}{8}$ in. beyond the end of the buckle and flush with the other end of the tug; thus, it serves the purpose of the turn-down part in the other method. Cut it all round the buckle, having first marked it for a little more than $\frac{1}{8}$ in., and then taper it in a straight line on each side of the buckle, beginning at the lower corner and bringing it to the same width as the tug at the other end. Make a round hole opposite the tongue of the buckle for the trace; its diameter should equal the width of the buckle.

Another piece, of identical form, is now cut, made from light leather like the first. Having slightly shaved the edges and the edge of the round hole in each piece, make an outer row of creasing near the edge around the hole and other edges. Another row must now be made close by, and one piece placed on the other, to act as a lining; prick the inner row very fine, and stitch the pieces together, giving the edges a neat finish. The safe being placed in position, stitch the loop as for the other style, but, instead of having sunk stitches, the safe should be stitched coarse from underneath; attach the hame clip at the other end and stitch it and finish.

When placing the loop on, and also afterwards, be careful to keep the safe in the centre. Some makers place the prongs of the clip one on each

side of the inner part of the two leathers of the safe. Then the safe must be made in the same manner and stitched on both sides as far as the loop end farther from the buckle. After fastening and riveting the clip, stitch the other part on both sides and then the top lay through them both.

The backband must be 8 ft. 2 in. long, the strap end 1 ft. 6 in., and the centre 3 ft. 3 in., the remainder being for girth. Make four rows all along, crossing the lines at each end of the middle part and making a line outside the stitches as in traces. Stitch about twelve per inch, and add three loops, but instead of stitching them with backband, do so when the latter is finished. Run a hot crease over the outer line and finish the backband. Punch holes in the same manner, and cut their edges a little for the shaft tug on the lower side.

The shaft tugs are made on the same principle as the cab tugs (see the companion volume), but are a little smaller and finer to match the backband; this and the tugs are $1\frac{1}{2}$ in. wide. Safes are sometimes placed under the shaft-tug buckles as well as on hame tugs, and a hole is cut for the backband as for the trace in the safe. This should be in one piece with the outer lay of the tug, overlapping just at the centre of the back, the safe running up from under the buckle. A paper pattern of the entire piece will save much waste.

The crupper is made in a similar style but lighter, the billet being 1 in. wide as a maximum, and the loop $1\frac{1}{2}$ in. The billet and body, however, are often lined, the edges being shaved even and the billet stuffed and rounded on the groove board; make one row of creasing outside the stitches as on the traces. Line the body with something very light and finish the work as with other parts. For extra fine harness there may be four lines of stitching in

the billet. Leave about $2\frac{1}{2}$ in. at the end of the slits unstitched for the dock, which must be lighter than for cab harness but of the same length and stuffed with linseed.

When the dock has buckles, loops, and chapes, the slits must be stitched to the extreme point and finished like other parts of the body. Adjust the lay in the same manner with two openings, but as the body is lined, stitch it a little coarser than usual from the underside, instead of sinking the stitches.

To make the hip strap for the breeching, cut the leather 4 ft. 4 in. by $1\frac{3}{4}$ in., and slit it at each end 1 ft. 5 in. by $\frac{3}{4}$ in. The extra width between the two slits must be cut off at the top with a punch, the point of the slits being rounded and a wavy pattern cut on each side in the centre between the slits. The edges being shaved and all parts rounded on the grooving board, an outer line of crease and another line for stitching can be made all round; then make four rows between the central slits. A wave or other pattern is then pricked at each end of the middle rows unless the ends are covered by an ornament

Another of similar size and pattern is now to be cut for lining the hip strap. After shaving the edges, stitch it with fine thread and finish off well; about eight holes must be made in each slit, beginning at 4 in. from the point. These parts, instead of being tacked, can be pasted together and allowed to dry before being stitched.

All lined straps for the best harness are stuffed in the centre, that is, shaves which are thicker on the outer side, owing to the way they are cut, are placed in the centre of the strap, the shaves having their thick sides abutting; thus the surface will be rounded from edges to centre. Having pasted the pieces on the strap, lay over them the top part, rounded and pasted closely along the

edge of the lining; an ornament at the junction of the slits will be required for the hip strap of good harness. Cut a pear-shaped piece of patent leather a little wider than the hip strap, and make two rows of fine stitching all round. Stitch the inner row, singly, through the leather, place a lining underneath, and stitch the outer row through both, leaving spaces at the sides of the bottom and top end unstitched.

Finish the edges and stitch the spaces through the hip strap for securing the patent piece. If this is adjusted singly, after stitching the inner row, stitch all round the outer one, raising the centre by stuffing it with leather. The metal or silver ornament can then be placed on the wide part, and then riveted, the legs being cut close below.

The breeching is only $1\frac{1}{2}$ in. wide, and there may be four rows of stitching all along. Stitch it finer and finish it better, rounding it well by placing a piece inside. The bearers are finer checked and better finished. The breeching straps must be lined; give them and the loops a neat finish. These straps may be 2 ft. 6 in. by 1 in., and, if desired, two narrow loops can be put on the top with one wider and stronger underneath.

Some people prefer a kicking strap (Fig. 90) instead of a breeching strap, and in this case the breeching, shaft, and hip straps are not employed, the opening in the crupper being used for the kicking instead of the hip strap. For two-wheel traps the kicking strap must be 5 ft. 3 in., and for four-wheeled 6 ft. 6 in., long and 1 in. or $1\frac{1}{8}$ in. wide; a lined strap should be made as directed for lining.

If the kicking strap is in three parts (Fig. 91) two brass or silver squares will be needed with a chape at each end of the centre-piece round the square and one at an end of each of the points;

when finished it must be of the same length as the full-length strap.

A patent leather centre-piece, with swelling middle, may also be placed between two squares for supporting an ornament; now join the centre-piece and points. There must be four rows of stitching in the ornamental piece on the hip strap, a metal ornament being placed in the centre. The kicking strap may also have in all parts two or four rows of stitching. After finishing, make half a dozen holes at each end. The kicking tugs should be 1 ft. long and of the same width as the strap. Having obtained proper kicking-tug buckles, put a loop below the buckle, line it like

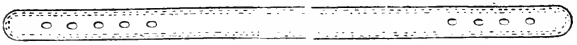

Fig. 90.

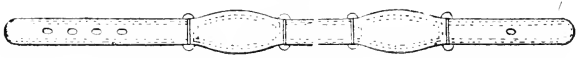

Fig. 91.

Fig. 90.—Kicking Strap. Fig. 91.—Kicking Strap in Three Parts.

the strap, finish, and make a hole 1 in. from the point.

Single leather driving reins are made as described for van harness (see the companion volume), but often have a piece on the centre of the fore-part, called "Melton reins" (Fig. 92). There is a thin neat strip of leather about half the width of the reins running all along the fore-part from the buckle to a little beyond the splice of the fore and hind part. The edges below are shaved and the strap is rounded in a groove board. The stitching is fine, with an outer fine line of creasing just outside the stitches, the centre being raised by placing a piece of thin string underneath the stitches and bringing it down over the string on both sides.

For this style of reins brown leather is employed for all parts of the reins and not merely for the hand parts. The stitching is done with fine yellow or white hemp beeswaxed thread. The hand parts (Figs. 93 to 96) are sometimes plaited, laced, lined, etc., to give the driver a firm grip when driving a strong-headed animal.

The lacing is made by punching holes about $\frac{1}{4}$ in. apart in the centre of the rein, for about 3 ft. along the part held by the driver, and then

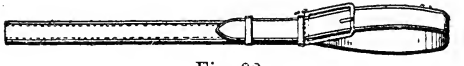

Fig. 92.

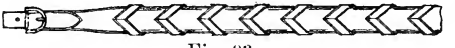

Fig. 93.

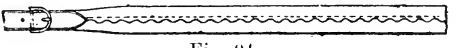

Fig. 94.

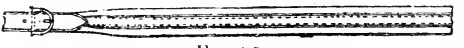

Fig. 95.

Fig. 96.

Fig. 92.—Melton Rein with Billet. Fig. 93.—Laced Rein Hand Part. Fig. 94.—Stuffed Hand Part. Fig. 95.—Lay on Hand Part. Fig. 96.—Plaited Hand Part.

running a lace through the holes. Place the centre part of the lace under the rein below the first lower hole; bring it up on both sides of the rein and run one point from each side down through the hole, and so on till the last hole is reached, where the points are stitched together on the rein.

For plaiting, the hand parts must be cut in three strips, none of them being cut right off; plait them firmly, and finally bring the end through to fasten the plait. In working the end it has

often to be put through the strips, and it is rather difficult to explain the operation. It will be found that as one end is plaited the other must be undone, because, when fast, both ends get plaited.

The stuffed hand parts overlap with specially dressed leather. Make a serge lay inside and scallop the upper edge very finely; stitch one row from end to end at the foot of the scallop, and place a chape and buckle with a strap stitched to them at the end of the hand part.

For a martingale a pair of ivory or bone stops (Figs. 97 and 98) will, in the first place, be required for the reins to prevent the rings catching in the bit; two ivory or bone rings will also be wanted to match them. Stops can be obtained either to

Fig. 97. Fig. 98.

Figs. 97 and 98.—Rein Stops.

run along the reins or be stitched to them. Cut a piece of leather, 1 ft. 3 in. by 2 in., to fasten to the rings, and slit it for 1 ft., narrowing it down at the other end to $\frac{3}{4}$ in. Turn it in 2 in. at the end of the slit and narrow towards the bend to $\frac{3}{4}$ in.; shave the point thin. A groove in width equal to half the thickness of the leather must now be cut on both sides of the slit and very near the edge. Round the slits and get pieces of cord to put in both. Line the point below the slit from the commencement of the rounding of the slits to the end. Shave the ends of the lining thin and stitch it fine.

The rings can now be stitched in the forepart and afterwards the round part stitched, the cord being kept deep down during the work. Get a firm hold and join the end of the ring chapes and the points of the lining at the bottom with the

round piece, making two good stitches through all at the beginning of the round end. Finish, close the grooves well, and rub, round, and polish the material bright.

The breast-plate part (Fig. 81, p. 133) can now be made as follows:—Cut a piece of patent leather, about 4½ in. long, to a fancy pattern, and swell it at the sides to match the drop-piece in the bridle and hip-strap piece; narrow it gradually for about 1½ in. towards the top to ¾ in. A buckle hole must now be made in the centre of the narrowed part, the point and edges being shaved. Then run two rows around with the race compass and prepare it for stitching. The inner row is stitched single leather, a piece of the same size and shape being cut to line it as far as the buckle hole and no farther.

Having obtained a ¾-in. ring to match the buckles, cut a chape for it, which, when bent, will be 2 in. long; shave the ends thin and narrow them a little. Now, quite in the centre, make a hole in the lining ⅜ in. from the bottom for the chape to pass so that the ring will hang down outside. Two rows of stitching must now be run upwards through the chape from the hole; then, having placed the lining under the patent leather piece, stitch the outer line through both.

Put the buckle on the top without turning down the chape, and make a billet 9 in. by ¾ in.; shave one end and round the other. After creasing it, prick the part to be joined to the buckle and stitch in the billet with a loop below the buckle, the end of this billet being below to join the lining previously stitched. The loop should be slack enough to admit two straps.

When the entire piece is finished and rubbed, make a runner loop to pass on the billet above the buckle, and then cut a strap 2 ft. 4 in. by ¾ in. wide. Adjust a buckle and loop to one end, in the

reverse way to the usual position, so that the strap can be buckled back through it. Now make a loop for the bellyband and punch six or eight holes in it, beginning about 8 in. from the buckle and continuing in the opposite direction to it. Buckle so as to form a loop, turn the other end in for about 1½ in. and shave the point, after which stitch it to the ring right side out and finish.

Now stitch a ¾-in. double piece of leather to another ring about 1½ in. long when doubled, leaving an opening in one end and the ring in the other. The opening allows the hame strap at the bottom of the collar to pass, the billet of the martingale being fastened to the ring. Give this a neat finish. Now punch a hole in the martingale billet and two or three holes in the point of the ring part; adjust the ring and small piece in the bottom of the collar to the hame strap and fasten the martingale billet to the ring.

Buckle the ring piece to the buckle of the martingale over the billet and through the same loop; this shows why the loop had to be made large. The girth must be passed through the loop part of the martingale. When driving, the reins must be put through the rings from the hand-part end because the stop prevents this being done from the billet end.

There is another style of martingale made with a single strap, a buckle being placed at one end. The length should be 5 ft. Round the end opposite the buckle end for a distance of 2 ft. 4 in., placing a cord inside it to shape it and cutting a groove for the stitches. Make an eye for the noseband by turning the end backwards at the round end and then, having placed the points between the edges of the round, stitch them firmly; give every part a neat finish. Now put a chape on a 1¼-in. ring, leaving an opening at the other end for the hame strap, as in the other martingale, this opening

being for the round part at the bottom of the collar running from below the chest to the noseband. Having unbuckled the noseband, put the buckle part through the eye of the martingale, which will make all complete.

A long breeching may also be made instead of the short one with straps to go round the shaft. The breeching should be 9 ft. 6 in. long by $1\frac{1}{4}$ in. wide; taper it to the end to about $\frac{7}{8}$ in. for 3 ft. along each side, and then line it to within a distance of 1 ft. 6 in. from each point. Owing to its length the breeching must be joined in the centre, the best end of the leather being always placed

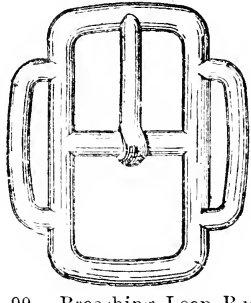

Fig. 99.—Breeching Loop Buckle.

towards the points. Stitch the centre all along, the 18-in. part being single, with two or four rows of fine stitches; leave two openings, one on each side, 1 ft. 6 in. from the centre for the bearers to pass and give it a neat finish. Make a chape at each end and prepare it for a buckle; then punch six or seven holes on each side, beginning about 6 in. from the end and moving towards the centre. Finally make four runner loops to pass round the points double.

The bearers should be made like ordinary breeching and the hip strap like the kicking strap,

but 4 ft. 4 in. long. The hip strap may also be made to act as a kicking strap as well, when it will be fastened to a pair of breeching loop buckles (Fig. 99), whilst the breeching runs through the loops in the buckle which acts as a carrier. The hip strap must be 5 ft. 6 in. long, made as described; then make the kicking-strap tugs. Thus the breeching can be employed with the tugs to form a kicking strap as well or without them, and the kicking strap can be employed without the breeching.

Two dees will be needed in the shaft tugs to fasten a long breeching. When making it, take two 1-in. dees and fill the flat part of them for about half the width towards the round part with a piece of leather, then place them inside the side of the shaft tug in the centre on the part next the saddle, and stitch them as the shaft tug is made. When adjusting the breeching, after the loops, without bearers, have been placed on the body, put two of the runner loops in the points on each side with the buckles before them. Then run the points through the dees on the shaft tugs and through the loops, after which they can be buckled; now tighten the loops, one near the buckle and the other close to the dees.

As can be observed, the chape is made on the same principle as the bearing rein, and the buckle is never stitched down; the breeching can thus be lengthened at both sides. There is another style of make which is a combination of long and short breechings; for this, ordinary breeching rings, and straps round the shafts, also with bearers, are employed. Other straps may be stitched to the ring and fastened like the bearing rein to the shaft tugs. Thus both styles are combined and the breeching is made doubly secure.

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